Deanship of Graduate Studies

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Assessment of Knowledge, Perception and Practices of Mothers of rachitic Children in Gaza Governorates

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Dedication

This work is dedicated to my father who did everything easy for me, my mother who is a model of great strength and love and praying for me every time

My husband, my sons whose support, encouragement, and love made this endeavor possible

Declaration

I certify that this thesis submitted for the degree of Master, is the result of my own research, except where otherwise acknowledged, and that this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed

Heba Nadi Zien Al Dien

Date: / / 2018

Acknowledgment

First of all, praise to Allah, the lord of the world, and peace and blessings of Allah be upon the noblest of all Prophets and messengers, our prophet Mohammed, all thanks for Allah who granted me the help and capability to complete this thesis.

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My tremendous thanks to my father, my mother, my husband, my sons and daughters, my brothers, and my sisters; thank you very much for your pray and support.

Last but not least, I would like to express my gratefulness to my friends for their support and encouragement.

I hope this work could be helpful for the practice and for anyone concerned.

Heba Nadi Zien Al Dien

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Abstract

Globally, rickets has received considerable attention from the public health concerns in a number of developed and developing countries, in which attention has been focused because of its effect on bone growth and mineral homeostasis; however, research studies revealed an inadequate knowledge of mothers with regard to this problem. This study aimed to assess the knowledge, perception and practices of mothers of rachitic children in the Gaza Strip. The study adopted cross-sectional design on 235 mothers. Number of cases from Gaza and Khanyounis was (99 mothers from Khanyounis), and (136 mothers from Gaza Governorate). These two numbers were taken as a convenience sample. The researcher used valid and reliable questionnaire as a tool for data collection. Different statistical procedures were used for data analysis including percentages, mean, independent sample t test, and One-way ANOVA. The study results revealed that the mean percentage of mothers' knowledge regarding rickets is 49.21%, the mean percentage of their practices is 36.34, while the mean percentage of perception regarding the causes of rickets is 59.0%. Also, the results revealed that there are significant differences in the level of mothers' knowledge and perception among their different educational levels ($p<0.05$) in favor of those who have university degree and higher. On the other hand, there are significant differences in the level of mothers' knowledge regarding rickets among their different areas of residence ($p<0.05$) in favor of the mothers who are living in Gaza governorate. On the other hand, there are significant differences in the level of mothers' practices between their different level of income ($p<0.05$) in favor of the mothers who have average income more than 1500 Shekel monthly, while there are no significant differences in the level of mothers' knowledge and perception between their different level of income ($p>0.05$). Additionally, the mothers who are working have significantly higher knowledge score than those who are not, while there are no significant differences in the level of mothers' knowledge, practices, and perception between those who have other children with rickets and who do not ($p>0.05$). The study results also revealed that there is a week significant correlation ($r=0.589$) between the level of mothers' knowledge and their practices regarding rickets ($p<0.001$). Also, there is a week significant correlation ($r=0.130$) between the level of mothers' perception and their level of practices regarding rickets. The study concluded that the mothers of children with rickets in the Gaza Strip have low level of knowledge and practices regarding rickets. The researcher recommends conducting health educational sessions for the mothers of children with rickets. Additionally, training workshops are needed to enhance mothers' practices regarding rickets and how to prevent the problem.

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List of Abbreviations

AEI	Ard El-Insan Palestinian Benevolent Association
MCH	Mother and Child Health
MOH	Ministry of Health
NGOs	Non-Governmental Organizations
NR	Nutritional Rickets
PCBS	Palestinian Centre Bureau of Statistics
PHCC	Primary Health Care Centers
RDA	Recommended Daily Dietary Allowance
RTI	Respiratory Tract Infection
UK	United kingdom
USA	United States
VDD	Vitamin D Deficiency
WB	West Bank
WHO	World Health Organization

Chapter One

Introduction

1.1 Background of the study

Rickets is a condition that has been recognized for many centuries and is due to defective mineralization of the growth plate in growing children. Nutritional rickets (NR) is a disorder of growing children due to defective mineralization of newly formed bone matrix because of vitamin D deficiency. Nutritional rickets continues to be a significant health problem for children worldwide with recent evidence of increasing incidence in many developed countries (Bharathi, 2015). Nutritional rickets remains a public health problem in many countries, despite dramatic declines in the prevalence of the condition in many developed countries since the discoveries of vitamin D and the role of ultraviolet light in prevention (Jennifer et al, 2017).

Rickets is a clinical disorder characterized by a failure of or delay in endochondral calcification at the growth plates of long bones, resulting in deformation of the growth plate, a reduction in longitudinal growth and the development of bone deformities. The disease is also associated with osteomalacia, which is a failure of mineralization of preformed osteoid on the trabecular and cortical bone surfaces of all bones. Rickets has been a public health problem for children living in temperate climates for many centuries (Pettifor, 2012). Rickets is a condition that has been recognized for many centuries and is due to defective mineralization of the growth plate in growing children. This defect compromises the mechanical support and mineral reservoir functions of the skeleton which leads to the typical skeletal deformities and the disordered mineral metabolism. Either calcium and/or phosphate may be deficient in the etiology of rickets. However nutritional

Vitamin D deficiency rickets remains the most prevalent cause worldwide and has made a resurgence in many developed countries in recent years (Pai, 2015).

The prevalence of rickets among Palestinian children 6 – 36 months old in the Gaza Strip was 4.1% where the higher percentage was recorded in Khanyounis reached 7.6% (WHO, 2011). The prevalence of rickets among Palestinian children was 12.5% with variation among governmental and UNRWA clinics (MoH, 2011).

The causes of rickets may be divided into three major categories based on their pathogenetic mechanisms. Normal mineralization of the growth plate and of osteoid at the trabecular and cortical bone surfaces is dependent on a number of different factors, including the presence of normal concentrations of both calcium and phosphorus, and of alkaline phosphatase. The classification helps categorize the causes into broad groups, each of which has characteristic biochemical changes, which help in establishing the pathogenesis of the disease in an individual child. In the calciopenic forms of rickets, the typical biochemical changes include hypocalcaemia and hyperparathyroidism, while in the phosphopenic form, hypophosphatemia with normal parathyroid hormone concentrations are characteristic and in many situations associated with elevated fibroblast growth factor 23 (FGF-23) concentrations (Pettifor, 2012).

The main cause of rickets is a lack of vitamin D. Also, not consuming enough calcium can cause rickets, Vitamin D deficiency can easily be improved with small dietary changes, which makes the most common cause of rickets the most easily avoidable, If rickets is caused by bad diet, the patient should be given daily calcium and vitamin D supplements, an annual vitamin D injection, as well as being encouraged to eat vitamin D rich foods (Brunner, 2017).

The clinical signs and symptoms of rickets include bowed legs, Delayed in crawling and walking, frontal bossing of the skull, widened wrist and ankle joints and short height. Treatment focuses on increasing the patient's intake of diet rich in calcium, phosphates, and vitamin D, and exposure to sunlight, if mothers of nutritional rickets' children committed to instructions provided by health care providers at AEI can easily improve their children's rickets, indicators of improvement signs of rickets include decrease wrist width, decreased bowed legs, and increased height private communication (Al-Wahidi.2017).

Treatment of nutritional rickets has traditionally been with vitamin D2 or D3, often given as a daily oral dose for several weeks until biochemical and radiological evidence of healing. However, other treatment regimens with single or intermittent high doses have also proved to be effective. It is now recognized that oral calcium either as dietary intake or supplements should be routinely used in conjunction with vitamin D for treatment (Shawa, 2016)**.**

Recognizing the interdependence of nutrition with health and other sectors, AEI undertakes a variety of preventive and curative health care activities, as well as work aimed at improving the nutrition and food situation of the Palestinian people, especially during stress periods, via to community health and nutrition rehabilitation centers in Gaza and Khanyounis cities **(** Al- Wahidi, 2017)

For several years, rickets and vitamin D deficiency has continued to be a major public health problem especially in Palestine. Awareness and educational programs for families have been effectively conducted in primary health care centers. Inspite of the steps taken to alleviate the vitamin D deficiency in infants, this problem persists in the country (Catakl et al.,2014) Vitamin-D deficiency causes rickets and osteomalacia due to inadequate

exposure of direct sunlight, dietary calcium deficiency and fluoride interaction syndromes (Kavith et al., 2015). These are commonest disorders (rickets) responsible for bone disease and deformities, caused by endemic skeletal fluorosis. Vitamin-D deficiency causes rickets in children and osteomalacia in the mothers that are commonest disorders prevalent in the population (Kavith et al., 2015). Studies worldwide identify lack of sun exposure as the main cause of rickets (Abate et al., 2016). In many rich industrialized countries, the prevalence of rickets in the general population diminished after the introduction of dietary supplementation. However, in such countries, vitamin-D deficiency rickets has re-emerged in recent years (Anthony et al., 2013). In a case- controlled study, the biochemical changes associated with nutritional rickets in children up to three years old in the Gaza Strip showed that rickets was more prevalent among children who were delayed in having complementary feeding, less sun light exposure, and living in flats (Mushtaha, 2006).

Nurses have always played a major role in patient assessment by obtaining a health history, determining risk factors such as, limited exposure to sunlight, Exclusive breastfeeding by a mother who has a vitamin D deficiency, Dark-pigmented skin, Prematurity. Nurses provide management by ensure patients receive the correct therapy and communicating with doctors about administer calcium and phosphorus supplements at alternate times to promote proper absorption of both of these supplements. Encourage exposure to moderate amounts of sunlight and administer vitamin D supplements as prescribed. Teach families that good dietary sources of vitamin D are fish, liver, and processed milk**.** (Kyle & Carman, 2017)

1.2 Research problem

Vitamin D deficiency is a major public health problem worldwide**,** most countries are still lacking data, particularly population representative data, with very limited information in infants, children, adolescents and pregnant women. (Palacios & Gonzalez, 2014)

Nutritional rickets remains a major health problem for children in many regions of the world including the Gaza Strip**.** Israel's siege and closure entered its tenth year. A decade of restrictions has placed enormous obstacles on the movement of people and goods inside and outside Gaza, and has severely damaged Gaza economy. Poverty is high, unemployment is 42%, and up to nearly 60% for young people. As a result, many of Gaza's children are most affected, led to an increase in the number of children suffering from rickets and other nutritional problems (AEI, 2016).

The incidence of rickets is particularly high among children who live in crowded houses almost devoid of sunlight (Anthony et al., 2013). Its consequences also are associated with the increase morbidity and mortality in childhood, moreover, it has increased cost of deliveries in mothers due to obstructed labour (Pettifor, 2016)

In Palestine especially in the Gaza Strip, the level of knowledge, perception and practices among mothers who have children with rickets is not adequate, and although a number of studies of rickets have been carried internationally and locally, very few studies have looked into the knowledge and practices of mothers regarding this condition in the Gaza Strip. This lack of studies will make the mothers who have children with rickets prone to the risk of knowledge deficit; this deficit will bring threat to their children in future due to inability to deal with the child with such condition. A study conducted in the Gaza Strip by Yassin and Lubbad (2010) has showed that rickets was more prevalent and higher among children of mothers who did not receive health education, this necessitate a need for

assessing the level of knowledge of mothers of the children with rickets periodically and make all possibilities to increase their knowledge, perception and practices about this disease. Last but not least, the problems arising from inattention to the knowledge level of mothers of children with rickets will have huge threat for their children, will have great burden on the health care providers in Palestine to pay more money in treating the complications of this condition uselessly, thus the child will be as a burden on the society; the issue can be prevented and treated initially by health education and disease prevention activities.

1.3 Justification of the study

Knowledge, perception and practices of mothers regarding rickets and the importance of vitamin D supplementation would affect the health of their babies in a positive manner. Previous research studies revealed an inadequate knowledge of mothers with regard to this problem (Catakl et al., 2014). This study was conducted in the Gaza Strip to determine the level of knowledge, perception and practices of mothers having children with rickets, the determination of knowledge and practices level would stimulate an action which will be taken by the ministry of health (MOH) and non-governmental organizations (NGOs) to intervene and make all possibilities to increase this level of knowledge if it is in low range, thus an improvement in their perceptions and practices regarding rickets could be improved and a tangible positive improvement in the health status of their affected children.

Antenatal care with regards to health and nutrition of mothers during pregnancy in relation with susceptibility of infants to be prepared and prone to developing rickets shortly after the birth of a few months.

A study conducted by Adegbehingbe et al. (2009) showed that only 36.5% of the mothers were aware of children with rickets and only 22.6% of the mothers had the correct knowledge and perception of the true meaning of rickets; since the mothers are the first care providers for their children especially in Palestine and she is the first and most important primary health worker for children, adequate knowledge and good practices about rickets should be a point of concern to be assessed to take a suitable action in future. This study will have important benefits on three levels; the first one which will be on the child with rickets and his/her mother, since the improved knowledge of mother regarding this condition will have great impact on her baby because she will be familiar with this condition and familiar with how to deal with her child. The second level will be on the non-governmental organizations, the results of this study might act as alarm for these organizations to organize educational campaigns for the mothers to increase the knowledge and practices level among them. The third level, that will be on the ministry of health, since it is the biggest care provider of health care system on Palestine, the results if this study will stimulate the ministry to take important actions in terms of health educational activities and making the needed treatment available.

This study will play a vital role in the mothers' behavior change toward rickets. To the best of researcher's knowledge, this study is the first to be conducted in Palestine in terms of assessment the mothers' knowledge, perception and practices.

1.4 Main aim of the study

The main aim of this study is to assess the knowledge, perceptions and practices of mothers of rachitic children in the Gaza Strip.

1.5 Objectives of the study

1. To assess the level of knowledge, perception and practices of mothers of rachitic children in the Gaza Strip.
2. To investigate the differences in the level of knowledge, perception and practices of rachitic children mothers in relation to different socio-demographic characteristics of the mothers.
3. To identify the correlation between the level of knowledge and practices of rachitic children mothers.
4. To identify the correlation between the level of perception about the causes of rickets and practices of rachitic children mothers.
5. To suggest specific recommendations for the non-governmental organisations and ministry of health regarding the prevention of rickets in the Gaza Strip.

1.6 Research questions

1. What is the level of knowledge regarding rickets among rachitic children mothers in the Gaza Strip?
2. What is the level of perception regarding rickets among rachitic children mothers in the Gaza Strip?
3. What is the level of practices regarding rickets among rachitic children mothers in the Gaza Strip?
4. Are there significant differences in the level of knowledge, perception and practices of rachitic children mothers and their age?
5. Are there significant differences in the level of knowledge, perception and practices of rachitic children mothers and their educational level?

6. Are there significant differences in the level of knowledge, perception and practices of rachitic children mothers and family income?
7. Are there significant differences in the level of knowledge, perception and practices of rachitic children mothers and place of residency?
8. Is there a significant correlation between the level of knowledge and practices of mothers of rachitic children?
9. Is there a significant correlation between the level of perception about the causes of rickets and practices of rachitic children mothers?

1.7 Context of the study

1.7.1. Socio-demographic context

The Gaza Strip is a highly crowded area, where approximately 2 million residents live on 365 km^2. According to MoH annual report 2013, the total number of Palestinian people estimate was 4.485.459 of which, 2.278.562 were males and 2.206897 were females. Gaza Strip has a population of 2,000,000 people. The age and sex distribution of population in Palestine showed that 43.3% of Palestinian people were less than 15 years old. The age group (0-4 years) was 16.6%, while ages over 65 years constituted only 2.2%, so Palestinian society is described as a young population (Palestinian Central Bureau of Statistics "PCBS", 2017).

The natural increase of Gaza population was 3.3%. Despite the progressive decline over years, the number of live births per 1,000 of population per year was still high in comparison to other countries. The Crude birth rate in 2013 was 32.1/1000 capita. The crude death rate declined progressively over years. The crude death rate for Palestine

declined from 3.0 per 1000 of the population in 2000 to 2.9 per 1000 of the population in 2013 (Palestinian central Bureau of Statistics “PCBS”, 2017).

1.7.2 Palestinian health care system

The health care system in Palestine is complex and unique and strongly influenced under the so-called Israeli occupation. The consequences of the closures and separation imposed a great challenge for the ministry of health by creating obstacles regarding the accessibility to health care services and affected the unity of the health care system in all Palestinian governorates. There are five main health care providers: the ministry of health, united nations relief and work agency for Palestine refugees in the near east (UNRWA), non-governmental organizations (NGOs), Palestinian military medical services and the private sector 2013 (MoH, 2017).

1.7.4 Child health care services

UNRWA provides care for children across the phases of the life cycle, with specific interventions to meet the health needs of new-borns, infants under 1 year of children, children under 5 years of age and school-age children. Both preventive and curative care is provided, with 7 a special emphasis on prevention. Services include mother and child health, new-born assessment, well-baby care, periodic physical examinations, immunization, growth monitoring and nutritional surveillance, micronutrient supplementation, preventive oral health, school health services and care of sick children, including referral for specialist care. Growth and nutritional status of children under 5 is monitored at regular intervals through UNRWA health services. Breastfeeding is promoted and mothers are counselled on infant and child nutrition, including the appropriate use of complementary feeding and micronutrient supplements. A new electronic growth monitoring system, based on the revised WHO growth monitoring standards, was

introduced in pilot health centers during 2011. The system documents the four main growth and nutrition-related problems among children under 5: underweight, wasting, stunting and obesity (UNRWA, 2016).

1.7.5 Ard El-Insan Association

Ard El-Insan Palestinian Benevolent Association (AEI) is one of the major Non-Governmental Organizations involved in nutrition rehabilitation in the Gaza Strip. It runs two nutrition rehabilitation centres in Gaza and Khanyounis cities. and that claims to deal with malnutrition, anaemia, rickets and other conditions, provide health and nutrition services for children and mothers and poor families to improve their health, quality of life, and community participation through projects and programs. (Ard El-Insan Association, 2017). Recognizing the interdependence of nutrition with health and other sectors, AEI undertakes a variety of preventive and curative health care activities, as well as work aimed at improving the nutrition and food situation of the Palestinian people, especially during stress periods, (Al-Wahaidi, 2016). Ard El Insan (AEI) works in child health and nutrition in the Gaza Strip. AEI's activities include helping mothers to rehabilitate malnourished children and the provision of health education as per child's nutrition and common childhood illnesses using a community approach setting. At AEI both centers there were 500 reported new cases of rickets in Gaza, middle and north governorate in 2016, of whom, 260 males and 240 females. Also, there were 640 reported new cases of rickets in Khanyounis center in 2016, of whom, 235 males and 225 females (Ard El-Insan Association, 2017).

1.8 Operational definitions of terms

1.8.1 Children with rickets

The researcher defined the children with rickets in this study as the children aged 6 – 36 months and diagnosed with rickets in Ard El-Insan Association**.**

1.8.2 Knowledge

The level of understanding of mothers of children with rickets which expressed as the correct response of the mothers regarding causes and treatment of rickets obtained from the answers of questionnaire's questions, which is the total score obtained from the mothers' answers on multiple choice questions within the study questionnaire.

1.8.3 Perception

Perceptions refer to the feelings of mothers of children with rickets towards the disease itself, as well as any preconceived ideas that they have towards it, which is the total score obtained from the mothers' answers on the study questions.

1.8.4 Practices

Are the ways in which the mothers of rachitic children demonstrate the knowledge they have through their actions, it was measured through reported mothers' answers to questionnaire, which is the total score obtained from the mothers' answers on multiple choice questions within the study questionnaire.

Chapter Two

Conceptual Framework and Literature Review

2.1 Conceptual Framework for the Study

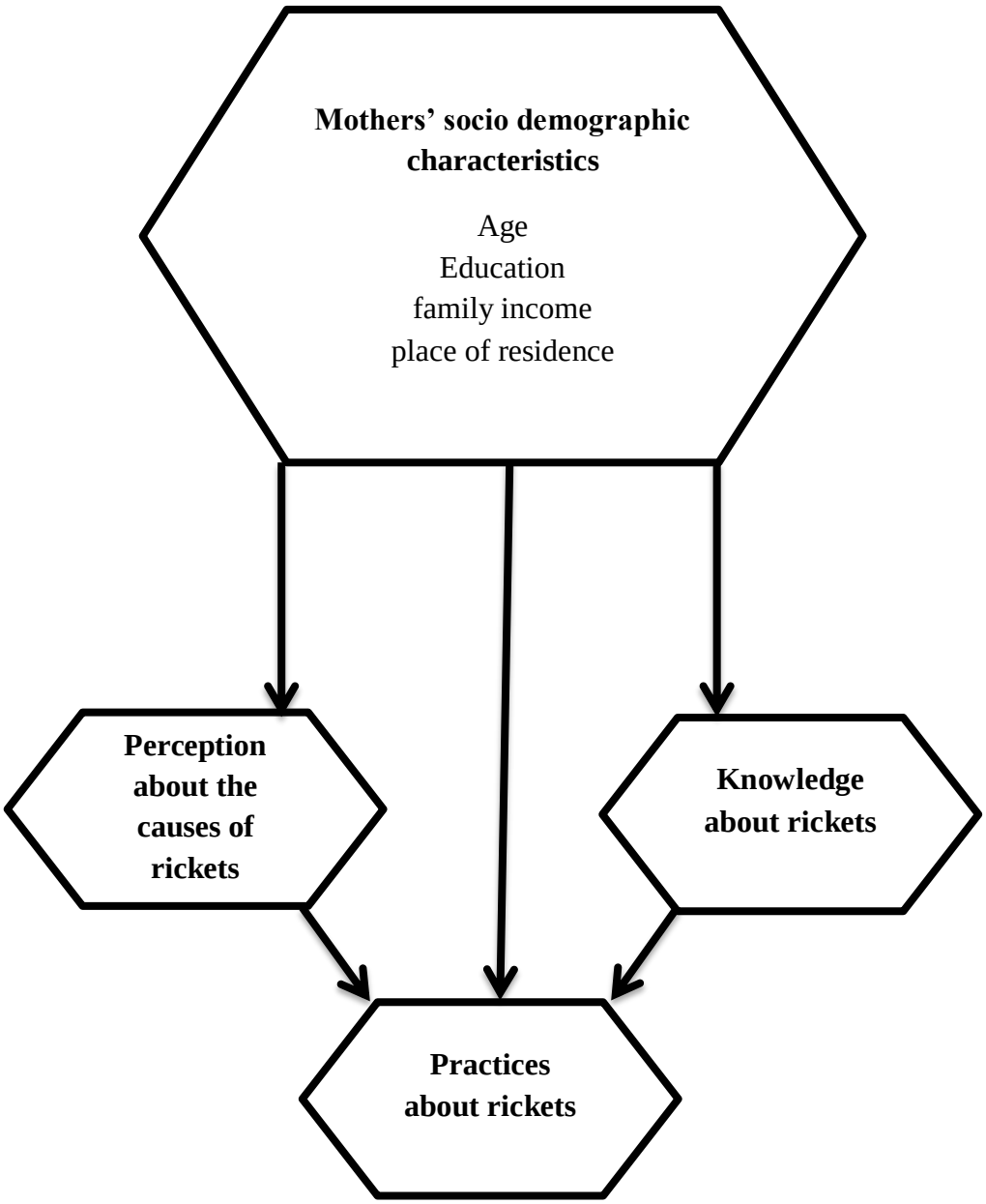


Figure 2.1: Conceptual Framework

Figure 2.1 clarifies the framework of the proposed study; the conceptual framework consists of dependent and independent variables. The dependent variables are three

domains, which are: 1) knowledge about the rickets, 2) perception about the causes of rickets and 3) practices of mothers toward the child with rickets. The independent variable is one domain, which are the mothers' socio demographic characteristics. Also, based on this study; knowledge about the rickets is considered as independent variable which may have an effect on practices of mothers toward the child with rickets (dependent variable).

2.2 Introduction and background

Rickets continues to be a significant health problem for children worldwide with recent evidence of increasing incidence in many developed countries. It is due to vitamin D deficiency and/or inadequate dietary calcium intake with variation in the relative contributions of each of these dependent on environmental factors such a dietary intake and sunlight exposure (Shaw, 2016). Factors that affect maternal bone mineral density may be related to the risk of nutritional rickets in their children (Jennifer et al, 2017).

The causes of rickets may be divided into three major categories based on their pathogenic mechanisms. Normal mineralization of the growth plate and of osteoid at the trabecular and cortical bone surfaces is dependent on a number of different factors, including the presence of normal concentrations of both calcium and phosphorus, and of alkaline phosphatase (Pettifor, 2012).

The rising incidence of nutritional rickets with its associated long-term squeal in children globally. In order to address the condition worldwide, it is imperative that accurate figures of its incidence are available particularly in at-risk communities. In order to obtain these figures, various screening tools and diagnostic criteria have been used with no standardization of methodologies, resulting in varying prevalence's which may under- or over-estimate the prevalence depending of the techniques used. There is no consensus on the usefulness of alkaline phosphatase as a screening tool, while there is general agreement

that the measurement of vitamin D status is unhelpful in screening for rickets (Pettifor,2016). Most of Palestinian people specially the poor ones consume inadequate amount of fish due to its high price. Instead mothers could depend on eggs, milk and its derivatives as available and cheap source of vitamin D to feed herself and her child. However, economic , social and cultural factors should not be excluded.(Yassin, 2010).

2.3 Over view of rickets

Rickets attributable to vitamin D deficiency is known to be a condition that is preventable with adequate nutritional intake of vitamin D. Despite this knowledge, cases of rickets in infants attributable to inadequate vitamin D intake and decreased exposure to sunlight continue to be reported all over the world, particularly with exclusively breastfed infants and infants with darker skin pigmentation (Wagner and Greer, 2008). Lack of direct sunlight exposure, inappropriate dietary intake and poor housing would contribute to the development of rickets (Matsuo et al., 2009). Exposure to sunlight particularly at morning hours and early introduction of vitamin D rich weaning food would prevent rickets among children, however, the fortification of milk with vitamin D is the best guarantee that children will meet their vitamin D needs in addition to other cereals and child food products may be fortified with vitamin D (Whitney et al., 2007).

In the Gaza Strip, rickets continues to be a public health problem despite abundance of sunshine most of the year. The health status of children as vulnerable group may come to a point with the worse situation in the Gaza Strip since several decades due to increasing poverty and the still ongoing suffering (Yassin and Lubbad, 2010). Rickets and vitamin D deficiency are common in many countries including Middle Eastern countries, developing countries such as Ethiopia, Yemen, Asian countries such as China and Mongolia (Pettifor, 2008).

Recent data indicates that vitamin D deficiency is pandemic, even the healthy and the young are not spared. High prevalence rates are reported in otherwise healthy infants, children and adolescents, and also from diverse countries around the world (Narendra et al., 2011). Several factors, such as inadequate exposure of infants to sunlight, exclusive breast feeding, darker skin, poor housing, fully covered dressing style of mothers and multiparity have been implicated (Ghulam et al., 2009).

Rickets is a childhood disorder of bone mineralisation at the growth plate, usually caused by inadequate concentrations of extra-cellular calcium or phosphate. The delay in or failure of endochondral ossification leads to deformation of the growth plate, the development of bone deformities and a reduction in linear growth (Prentice, 2013). Children with bone deformities may be severely disabled, have increased morbidity and decreased quality of life. The burden is currently greatest and the public health impact most substantial in developing countries, where crippling deformities reduce physical capacity and drain economic prospects (Pettifor, 2012). Rickets is a disorder that often occurs during childhood in which the bones become weak and deformed. The rickets comes about due to a low intake of vitamin D, which means that low exposure to sunlight can also contribute, Rickets mainly affects children, but may also affect adults in a condition known as osteomalacia. In most cases, the child has experienced severe and long-term malnutrition, usually since early childhood. (Mersch, 2018).

Nutritional rickets can have a major impact on the health of infants, children, and adolescents, with ramifications that persist into adulthood. The morbidity and mortality associated with NR can be devastating, with substantial but poorly recognized consequences for society and health economics. (Pettifor, 2016)

Clinical vitamin D deficiency, manifested as rickets, is a major public health problem in many parts of the world. Action is urgently needed to reduce the risk of clinical vitamin D deficiency worldwide among infants and young children. Effective ways to reduce the risk includes; promoting safe skin exposure to ultra violet sunlight, improving dietary intakes of vitamin D and increasing awareness among policy makers, health professionals and the general public about the importance of vitamin D (Prentice, 2008).

2.4 Epidemiology of rickets

Rickets is an ancient illness that was thought to have been cured in the early part of 20th century but has made an unpredicted come back in recent years throughout the world (Bell, 2011). For instance, in Bangladesh rickets has reappeared with up to 8% of children clinically affected in some areas (Craviari et al., 2008). In the Middle East rickets was prevalent especially in the Gaza strip (WHO, 2005) where it continues to be seen despite the sunny climate. In spite of various protective approaches, rickets has remained a global health problem among infants and children.

2.5 Risk Factors for rickets

Lack of sunlight exposure and health education, and exclusive breastfeeding were the major risk factors contributed to rickets among children in the Gaza Strip (Yassin, 2010). Zuaiter showed that poor dieting and less values of calcium even vitamin D of the mother either in the preparatory state in adolescence or in pregnancy are strongly associated with the disease (Zuaiter,2011). Normal bone growth is reliant on adequate serum levels of vitamin D. Hypovitaminosis D (insufficiency or deficiency of vitamin D), now known to be prevalent in UK is linked to the child presenting with musculoskeletal symptoms and deformity, including rickets (Judd, 2012). underlying factors, such as political instability, Israel's blockade and closure of Gaza poor economic development, conflict, inequality,

and some dimensions of globalization (Global Nutrition Report, 2016).In spite of adequate sunlight and efforts of health care providers in Gaza strip, the rickets still a problem .

Nutritional rickets is most commonly seen in children from the Middle East, Africa, and South Asia in high-income countries. Dark skin pigmentation, sun avoidance, covering the skin, and prolonged breast feeding without vitamin D supplementation, are important risk factors for vitamin D deficiency, and combined with a lack of dairy products in the diet, these deficiencies can result in insufficient calcium supply for bone mineralization. (Thacher, et al., 2016)

Dark skin doesn't react as strongly to sunlight as lighter skin does, so it produces less vitamin D. A form of rickets can be inherited. This means that the disorder is passed down through your genes. This type of rickets, called hereditary rickets, prevents your kidneys from absorbing phosphate. Geographic Location ,our bodies produce more vitamin D when they are exposed to sunshine, so you are more at risk for rickets if you live in an area with little sunlight. You are also at a higher risk if you work indoors during daylight hours. (Al Rekhawi, et al 2017)

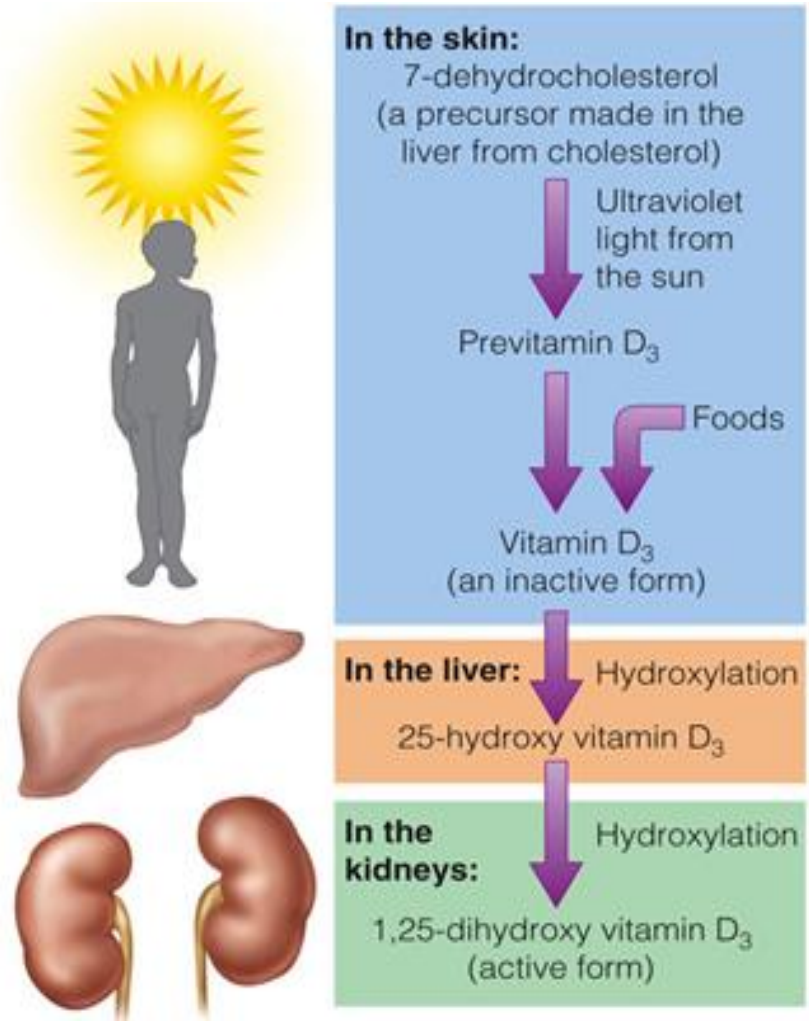
Vitamin D deficiency occurs in all parts of the world is a global health problem. The extent of vitamin D deficiency varies with season and sun exposure. Also, the degree to which the body of religious or cultural reasons is covered, the skin color and, dietary habits and the use of supplements have an impact on the vitamin D status**.** (Bjørklund, 2016).

inadequate vitamin D status of the mother during pregnancy also has other negative effects on the fetus that may prevail throughout the life cycle. (Türkmen and Kalkan, 2018). Studies have shown that vitamin D has different immunomodulatory properties associated with the risk of respiratory tract infection (RTIs) in childhood**,** Several studies have

associated vitamin D deficiency with an increased risk of RTIs, and vitamin D supplementation**.** (Pettifor, Thandrayen, & Thacher, 2018)

2.6 Pathophysiology

Vitamin D synthesized in the skin from cholesterol, then Liver converts Vit D to 25-OH Vit D, then kidney synthesizes 1,25-$(OH)_2$ Vit D from 25-OH Vit D. Vitamin D is transported in the circulation by vitamin D binding proteins. (Al Rekhawi, et al 2017)



2.7 Development and symptoms of rickets

Rickets is a term signifying failure of mineralization of growing bone or osteoid tissue with characteristic changes of growth plate cartilage among infants before closure of growth plate (Muzaffar et al., 2017). Vitamin D deficiency can present with a variety of symptoms other than musculoskeletal symptoms like recurrent acute respiratory, diarrhoea and seizures (Muzaffar et al., 2017).

Rickets is a nutrient deficiency disease due either to primary deficiencies of vitamin D or calcium or to combined deficiencies of both elements (Fischer et al., 2008). Often rickets is brought about by factors not related to diet such as genetic and environmental predisposition (Fischer et al.,2008) stated that diagnosis of rickets is considered clinically when a child presents with limb deformities, has beaded ribs and widened wrists and ankles. Symptoms of rickets vary widely including pain or tenderness in the bones of the arms, legs, pelvis, or spine, stunted growth and short stature, bone fractures, muscle cramps, teeth deformities, such as: delayed tooth formation, defects in the tooth structure. Skeletal deformities, including: an oddly shaped skull, bowlegs, or legs that bow out, bumps in the ribcage, a curved spine ,pelvic deformities (Al Rekhawi, et al 2017). Also, restlessness and lack of sleep are common among rickets patients. Other visible signs are cupping of wrist, fraying, metaphyseal widening and demineralization of the distal radial and ulnar metaphases (Chehade et al., 2011).

2.8 Factors associated with rickets in the Gaza Strip

In the Gaza Strip, rickets continues to be a public health problem despite abundance of sunshine most of the year. The health status of children as vulnerable group may come to a point with the worse situation in the Gaza Strip since several decades due to increasing poverty and the still on-going suffering. Rickets was higher with decreasing frequency of exposure to sunlight and among children who had been fully dressed. lack of sunlight exposure and health education, and exclusive breastfeeding were the major risk factors contributed to rickets among children in the Gaza Strip (Yassin and Lubbad, 2010) Inadequate dietary vitamin D intake, darker pigmented, inadequate sunlight exposure (Baroncelli et al, 2008), primary deficiency is highly prevalent, even in countries with abundant sunshine, when skin exposure to ultra violet sunlight is limited by lifestyle and other factors (Prentice, 2008), remaining indoors due to seasonal, cultural or religious reasons, air pollution which limits sunlight exposure, dietary calcium deficiency which contributes to development of rickets are factors associated with the occurrence of rickets.

2.8.1 Nutritional vitamin D status and rickets

Rickets has been viewed to be caused by a combination of factors, among them vitamin D deficiency (Holick and Chen, 2008). Vitamin D is essential in calcium homeostasis and calcium absorption (Peacock, 2010). It aids in calcium absorption by helping to make the necessary calcium-binding protein. However, the integrity of the system depends critically on vitamin D status and if there is a deficiency of vitamin D. Researchers have observed that, vitamin D deficiency is common in the world including Southern Europe, the Middle East, India, China and Japan (Lips, 2007).

The major cause of vitamin D deficiency globally is less appreciation of sunlight's role in providing infants and children with their vitamin D3 requirement. Deliberate, avoidance of

sun exposure may partially explain the recent observed vitamin D deficiencies throughout the world (Abrams, 2008). The prevalence of vitamin D deficiency has largely increased with the modern lifestyle (Ozkan, 2010). In fact, with adequate sun exposure, vitamin D is not a required dietary nutrient as skin would make enough. As sun exposure has decreased with urbanization coupled with increased indoor activities vitamin D status has decreased in humans too (Lee and Jiang, 2008). For instance, prevalence of hypovitaminosis D was 77% in Indian children who were deprived sunlight and 16.4% of them had rickets (Ekbote et al. 2010). Cultural practice which is associated with a reduction in time spent outdoors or an increase in body surface area covered with clothing may reduce production of vitamin D in skin (Holick et al., 2008). Mothers and care giver practices may therefore contribute to vitamin D deficiency and rickets as some parents restrict sunlight for the first eight months of infants' life for undefined reasons or inadequate knowledge of the importance of the sun (Holick et al., 2008).

2.8.2 Social and economic factors and rickets

NR has been increasingly reported in high- and low income countries. The incidence of NR has been reported as 2.9, 4.9, 7.5, and 24 per 100,000 in Canada, Australia, the United Kingdom, and the United States (Pettifor, 2016). For instance, in Turkey, rickets is a disease of the underprivileged and is strongly correlated with poverty (Baroncelli et al. 2008).

Good care at household level ensures that food and health care resources provided to individual members result in optimal survival, growth , and development. Studies previously conducted in different parts of the world observed that various societal factors related to rickets in certain ways signifying multi-factorial scenario. For instance, in Turkey, rickets is a disease of the underprivileged and is strongly correlated with poverty

(Baroncelli et al. 2008). These could limit their food choices and hence nutrient density of their diets. In Kabul's study children under 5 years of age from low social economic status were found to be more prone to developing rickets (Manaseki-Holland et al., 2008).

2.8.3 Nutritional status and rickets

Studies have shown that rachitic infants and children often have delayed milestones. A study in Ethiopia revealed that underweight was strongly associated with rickets, nutritional rickets was also related to underweight and weak muscles (Nield et al. 2006). It is often suspected that children who fail to grow are suffering from rickets which cannot be noticed physically. Very low birth weight is associated with rickets in infants often due to poor skeleton development. A similar observation was made in Nigeria, where very low birth weight was found to be an important factor in the etiology of rickets (Adejuyigbe et al., 2008). Although infants' weights were recorded during clinic visit, it was not monitored against rickets periodically. This study therefore sought to determine the nutritional status of study subjects' diagnosed with rickets attending MCH clinic (Baroncelli et al. 2008).

2.8.4 Breastfeeding and rickets

Notably, it is clear that human milk is the best nutritive food for infants. Breastfed infants generally are protected from rickets during the first few months of life provided the maternal vitamin D status was adequate during pregnancy (Chehade et al. 2011). Rickets was higher among children of mothers who did not receive health education, and exclusive breastfeeding were the major risk factors contributed to rickets among children in the Gaza Strip (Yassin and Lubbad, 2010)

A hospital study in Pakistan found that maternal vitamin D deficiency is common among mothers of infants diagnosed with rickets (Salama and El-Sakka, 2010). Rickets was remarkably common among children who are breastfed exclusively (Chehade et al. 2011). Breast milk normally contains insufficient concentrations of vitamin D which are estimated at 20-60 IU/L. Breastfeeding might be one the contributing factors for rickets if the infant is not adequately exposed to sunlight for endogenous synthesis of vitamin D and if the mother is deplete in vitamin D levels transferring lower amount of vitamin D to infant through breast milk (Soumya, 2017).

In Turkey therefore, exclusive breastfeeding was reported to be an important reason leading to nutritional rickets (Ozkan, 2010). Exclusive breast-feeding is recommended up to 6 months of age with all its beneficial effects on child survival (Soumya, 2017). Breastfeeding without vitamin D supplementation has been thought to be a major predictor of vitamin D deficiency among infants (Savino et al. 2011) and hence could predispose them to rickets.

2.8.5 Dietary calcium and occurrence of rickets

Calcium ranks fifth after oxygen, carbon, hydrogen, and nitrogen, in the composition of the human body. Nearly all (99%) of total body calcium is located in the skeleton and the remaining 1% is equally distributed between the teeth and soft tissues (Compensation for Organ, 2013) Particularly, calcium is not abundant in diets and low intakes are widespread in many populations as reported by different studies.

A prospective analysis of Egyptian patients with and without rickets showed that most patients had calcium insufficiency (Baroncelli et al., 2008). Similarly, studies in Bangladesh reported that insufficiency of dietary calcium consumed by children was thought to be the contributory cause to nutritional rickets among children (Craviari et al.

2008). Over one billion humans have insufficient circulating levels of vitamin D, and calcium dietary insufficiency is common in developing countries. Worldwide, rickets is considered to be the most common non-communicable disease of children. Rickets can be due either to primary deficiencies of vitamin D or calcium or to combined deficiencies of both elements (Fischer, Thacher, & Pettifor, 2008). Additionally, scanty data suggest that some common causes of rickets are inadequate drinking of milk or lactose intolerance, consequently reducing calcium intake by infants and children. Therefore, in developing countries where calcium intakes are characteristically low dietary calcium deficiency appears to be the major cause of rickets among children (Glorieux & Pettifor, 2014)

2.9 Complication of vitamin D deficiency

Vitamin D deficiency during pregnancy is associated with a risk of reduced fatal bone mineral content, and occasionally presents with rickets at birth or in early infancy in populations in which severe vitamin D deficiency is common. Large studies from the USA and Norway link low vitamin D intake or status in pregnancy with an increased risk of pre-eclampsia, which is an important cause of perinatal morbidity and mortality. Therefore, urgent action is required worldwide to prevent epidemics of vitamin D deficiency in pregnancy. Severe hypocalcaemia with or without seizures is a common complication of vitamin D deficiency in the neonatal period or in early infancy owing to maternal vitamin D deficiency during pregnancy, coupled with inadequate vitamin D intake from human milk or supplements (Dawodu & Wagner, 2012).

2.10 Complication of rickets

Rickets can have severe consequences, including death from cardiomyopathy or obstructed labor, myopathy, seizures, pneumonia, lifelong deformity and disability, impaired growth,

stunting and decrease mental performance, and pain. Its resurgence widespread (Munns, et al., 2016).

2.11 Recommended intake of vitamin D and prevention of rickets

For the prevention of rickets, it is recommended to use 400 IU per day intake of vitamin D for all infants from birth and 600 IU in pregnancy and alongside prenatal and postnatal follow-up programs. High-risk groups require lifelong supplements and food fortification with vitamin D or calcium (Uday & Hogler, 2017).

2.12 Role of education as a preventive measure in the development of rickets

In rural areas, most young children grow up on diets devoid of commercial infant products. It is, thus, challenging to find a „point source" at which vitamin D or calcium can be introduced in a way that would reach all children at risk in a developing country. Therefore, it makes sense to try to provide community-wide (or even nation-wide or region-wide) education to try to increase the habitual intake of calcium in areas where calcium is widely deficient in the diets of young children (Craviari et al, 2008).

A study conducted in Pakistan to determine the contributing factors of rickets among children at Hyderabad, indicated that maternal education and health seemed to be an important factor. Maternal education may play an important role as it is expected that a conscientized mother would adopt better and improved child-rearing practices (Majeed et al, 2007). Pediatricians and other health care professionals should strive to make vitamin D supplements readily available to all children within their community, especially for those children most at risk (Wagner and Greer, 2008)

Good adherence to vitamin D supplementation is associated with relatively simple factors such as offering universal supplementation and checking adherence at routine childcare

visits. Supplementation should be adopted independent of the mode of feeding. Interestingly, financial family support and not free vitamin D supplies enhanced compliance (Uday, et al., 2016)

2.13 Nursing role

Nursing assessment include Obtain a health history, determining risk factors such as: Limited exposure to sunlight, exclusive breastfeeding by a mother who has a vitamin D deficiency, dark-pigmented skin, prematurity, and note history of fractures or bone pain. Observe for dental deformities and bowlegs. Decreased muscle tone may also be present. Note low serum calcium and phosphate levels and high alkaline phosphatase levels. Radiographs may show changes in the shape and structure of the bone. Administer calcium and phosphorus supplements at alternate times to promote proper absorption of both of these supplements. Encourage exposure to moderate amounts of sunlight and administer vitamin D supplements as prescribed. Teach families that good dietary sources of vitamin D are fish, liver, and processed milk (Kyle & Carman, 2017).

In poorer communities, nurses who are involved with primary patient care are usually the first health care professionals to come into contact with the general public. They are employed in a variety of health settings and are therefore in a unique position to be able to play an important role in health promotion. the nurses are often the first and only link that poorer communities have to medical care of some sort. This is often also the only source of information parents have to health matters. Nurses are expected to have knowledge of a wide range of issues and need to be on the forefront of prevention in general**.** (Archives of Community Medicine and Public Health**,** 2015).

Nurses have always played a major role in patient safety. As the professionals who are with patients around the clock, nurses are positioned to prevent medication errors, ensure

patients receive the correct therapy and provide safeguards from problems, observing and monitoring patients' conditions, maintaining records and communicating with doctors (wolfgang, 2015). There is need to create an understanding and awareness to the caregivers and in particular the mothers through maternal education as an educated mother will have better and improved child care practices. This would best be spearheaded by the service providers in the hospitals and community such as community health workers (Njeri 2013).

2.14 Implementation Strategies for preventing rickets

Healthcare authorities should identify the specific risk groups to target intervention which is a straightforward task as skin colour, ethnicity and culture are visible factors; similarly, information on dairy intake as the main source of dietary calcium can be easily obtained . Healthcare providers should recognise the need to supplement the high-risk (Uday & Högler, 2017).

Policy makers should clarify the responsibilities of healthcare professionals delivering the policy such as providing information on prevention, prescribing supplements and checking adherence at child health surveillance or immunisation visits. Interestingly, free supply of vitamins alone does not automatically enhance adherence and participation (Uday & Högler, 2017).

2.15 Previous studies

Alsuwat, et al. (2018) conducted a study to discuss and improve the knowledge and the awareness of mothers in the Kingdom of Saudi Arabia about rickets disease and its environmental and nutritional risk factors. Cross-sectional retrospective Study at the maternal Children Hospital in Taif, Saudi Arabia. Data collection was done using a pre-specified questionnaire after obtaining the patients consent. 150 mothers that visited the Maternal Children hospital-Taif, Saudi Arabia with their children. There were 79

(52.7%)male children and71 (47.3%) female children. One hundred and thirty-three (133) (90.7%) mothers feed their children in addition to either bottle feeding or just breastfeeding ;and 17 (11.3%) use bottle feeding only. Sixty-three (63) (42.0%) children were found to have Vitamin D deficiency with their children. There were 146 (97.3%) of the children with vitamin D deficiency. The most preventable age group was between 20-30 years, 49.3%were academic and 92.7%were Saudi mothers. Of the participating mothers, 35.3%have 3 or4 children. Their answers regarding what knowledge they had about Rickets disease. Sixty-eight(68%) thought that sun rays were the best source of vitamin Dand50.7% reported that vitamin D was only important for growth. The results of questions about the awareness of the supplements, what can be its alternative and the necessity of its uptake. Found 85 Mothers never used it with their children and the mothers who did used it followed different duration, doses and obtained it from different sources.

In this study there is misunderstood about role and natural sources of vit D among our study group and The majority of them believe importance use Vit D supplements with breastfeeding and sun exposure to prevent Vit D depletion**.** In Saudi Arabia, there is a need for campaigns that spread awareness among mothers and young adult females about the importance of vitamin D, diets containing adequate levels of it as well the risk factors that cause its deficiency**.**

Muzaffar, Abdulsubhan, & Baqasi, (2017) conducted a study to explore the magnitude of nutritional rickets among Saudi infants, and the various clinical presentations, as well as to address the possible operating risk factors behind the disease. Cross sectional study has been conducted among 169 Infants, aged 4 – 24 months, who were seen and evaluated, at King Abdulaziz Hospital and Oncology center, pediatrics Infants, endocrine clinic in Jeddah - Saudi Arabia, during the period from January 2015 to December 2016, and confirmed to have rickets were included. The diagnosis was based on clinical, biochemical

and radiological features as suggested . All patients were treated with oral vitamin D preparation, calcium and appropriate dietary restriction if needed. Diagnosis of inherited forms of rickets and conditions mimicking rickets were based on criteria suggested.

Infants under 2 years of age are liable to have vitamin D deficiency rickets if they are exclusively breast fed and having inadequate exposure to sunlight. Delayed introduction of complementary foods and malnutrition are also important contributing factors in nutritional rickets. Vitamin D deficiency can present with variety of symptoms other than musculoskeletal symptoms like recurrent acute respiratory, diarrhea and seizures . These are under recognized features of vitamin D deficiency. Recommended that rickets should be investigated for patients reporting these complaints. It is also possible for clinical signs and symptoms to be present with no radiographic evidence of rickets .

Another study conducted by Adegbehingbe et al. (2009) to assess the knowledge of mother's on the aetiology of rickets associated knee deformities and the cultural perception of its treatment. Data collection was done using interviewer based semi structured questionnaires. A total of 464 questionnaires were administered with a response rate of 86.9%. Over half (59.8%; N=241) and 36.5% (147) of the mothers were aware of children with knee deformity and rickets, respectively. Ninety-one (22.6%) mothers had the correct knowledge and perception of the true meaning of rickets. Rickets associated knee deformity aetiology was wrongly perceived to be mainly hereditary (53.8%), cancer (50.9%) and bone infection (48.1%).

Very low proportions of mothers had correct knowledge on the causes of rickets such as inadequate exposure to sunshine (21.3%) or inadequate intake of calcium (21.1%). The knowledge of aetiology of rickets was influenced by education ($P<0.02$), skilled occupation ($P<0.0001$) and the previous birth of a child with knee deformity from rickets

(P<0.001). The mother's cultural perceptions of treatment for childhood rickets associated knee deformities was significantly affected by age (P<0.001), education, (P<0.001), skilled occupation (P<0.000), history of knee deformity (P<0.04) and mothers with children diagnosed to have knee deformity (P<0.004). the study concluded that the awareness of mothers about rickets in Nigeria is still very low. It is a major reason for late presentation or complete failure to seek for adequate treatment of the knee deformity due to rickets. Increase and sustain public health enlightenment programmes are necessary for prevention. Health policy should incorporate free surgical fees for the established knee deformity to encourage community participation in the management of the condition..

On the other hand, Yassin and Lubbad (2010) conducted a study to assess the various risk factors associated with nutritional rickets among children aged 2–36 months old in the Gaza Strip. The study sample consisted of 170 children with rickets and 170 control children. Rickets was higher among exclusively breast-fed children. Early introduction of complementary food particularly that contains eggs or fishes protects against rickets. Children who were not exposed to sunlight had more rickets. Rickets was higher with decreasing frequency of exposure to sunlight and among children who had been fully dressed. None of the control children were found to live in the basement compared to 11.8% cases.

The more deliveries the mothers had, the more rickets was found among their children (P = 0.028). Rickets was higher among children of mothers who did not receive health education. Their study concluded that a lack of sunlight exposure and health education, and exclusive breastfeeding were the major risk factors contributed to rickets among children in the Gaza Strip.

Njeri (2008) conducted a comparative cross sectional study to determine the knowledge, perceptions and practices regarding rickets in rickets and non-rickets cases. The study findings showed that caregivers of children with rickets had a higher mean age than the caregivers of children without rickets. Children with rickets had a higher mean age than the children without rickets. Households that depend on self-employment, farmer and casual labor had a higher percentage of children with rickets.

The mean knowledge scores of caregivers of children with rickets were higher than the caregivers of children without rickets. The mean practice score between caregivers of children with rickets and caregivers of children without rickets were not significant. The mean perception score of caregivers with children with rickets and caregivers of children without rickets were not significant. There was a positive correlation in the knowledge and perception scores in the two groups. Caregivers of children with and without rickets had their knowledge, perception and practice scores above average. Caregivers of children with and without rickets earned less than the recommended wage salary in Kenya. The study concluded that there is need to create an understanding and awareness to the caregivers and in particular the mothers through maternal education.

The main aim of this study is to find out the mother's health knowledge about rickets .Data on mothers' health knowledge were collected using a special questionnaire . 1000 mothers were interviewed on the subject ., randomly selected from attendants of primary Health care centers (PHCC) in Baghdad Governorate .The results found that mothers who had high education level had better health knowledge concerning rickets, 98.2 % mothers were heard about rickets , and 93.3 % mothers know the symptoms of the disease . The mothers who live in urban area have more knowledge about rickets than mothers who live in rural area . And most of mothers did not know how to prevent the disease, 70.3 % of mothers

from urban area , and 79.2% of mothers from rural area .The researcher recommend that the educational program in nutrition for the mothers should be carried out.

Also, Bathi et al. (2012) conducted a descriptive comparative cross-sectional to explore knowledge, attitude and practice of patients receiving vitamin D supplement and attending primary health care (PHC) in Kuwait. Subjects and methods: The study design is a simple one that was carried out in two PHC centers. Two hundred patients were selected randomly from a list of all registered patients in the selected centers.

Study findings showed that only 28.5% of participants were aware about their condition, 53.5% related pain to vitamin D deficiency, 33.5% knew the presence of relation between vitamin D deficiency and joint pain. One third of the participants received the loading dose of vitamin D, and, 17.5% had the maintenance dose. Only 21.0% believed that they feel better regarding musculoskeletal symptoms after taking treatment doses and 12.5% of the participants knew that the level of vitamin D dropped again after stopping medication. Only 29.5% knew the relation between vitamin D and other diseases.

The majority of patients (85.5%) agreed about the importance of sunshine as a source of vitamin D and 60.0% thought that they can get vitamin D from the nutrients. Regarding the main sources of knowledge about vitamin D, 40.5 % of patients got knowledge from doctors, 12.5% from the media, 29.0% from relatives and friends, 8.5% from background information and 9.5% from journals and magazines. The study concluded that the majority of the study participants had limited knowledge, poor practices, and negative attitude toward vitamin D problems. Planning health education interventions for this group of patients are essential.

Ciceket al. (2015) conducted a descriptive study to determine the level of knowledge and attitudes of mothers having children 0-3 years of age, regarding Vitamin D use. Face to

face interview was conducted with participants to fill up the questionnaire. The results of the study showed that 33% of the mothers mentioned that they gave vitamin D to their children on a regular basis and 40% stated that mothers milk contained adequate amounts of vitamin D. No difference was found between education level of mothers and health related training prior to birth, in regard to vitamin D usage for their children ($p > 0,05$). The study concluded that the level of knowledge of mothers and their attitudes regarding regular vitamin D usage for their children were not found to be at an adequate level.

Lastly, Ciceket et al. (2016) have conducted a cross sectional descriptive study to assess practice and factors affecting sunlight exposure of infants among mothers attending governmental health facilities in Debre Markos Town. The study showed that 55.4% of the mothers had poor practice about sunlight exposure. In multivariate analysis, mothers' educational status had significant association with practice of sunlight exposure of infants. The study concluded that the findings in this study showed mothers had poor practice about sunlight exposure. Therefore, mothers need to be educated about the importance of sunlight exposure.

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Chapter Three

Methodology

3.1 Introduction

This chapter presents study methodology, which include the study design, study population, sample of the study, response rate, setting of the study, inclusion and exclusion criteria, study instrument, validity of the instrument, pilot study, ethical considerations and statistical analyses.

3.2 Study design

The design of this study was a quantitative analytical cross-sectional. This design was chosen because it is suitable in terms of people, resources and it is relatively practical and manageable.

3.3 Data collection

Data was collected by the researcher and trained two research assistants using interviewing questionnaire by face to face with mother, the quality of data collection was ensured by the follow-up and monitoring of the researcher. The duration of data collection was from June to August 2018.

3.4 Study Setting

This study was carried out in Gaza Governorates, mainly at the two centers of Ard El-Insan Palestinian Benevolent Association in the Gaza governorate and Khanyounis governorate.

3.5 Study period

The study was conducted during the period from February to October 2018.

3.6 Study population

The target population of this study was consisted of mothers of children with rickets in the Gaza Strip who are attending and registered at Ard El-Insan Palestinian Benevolent Association in Gaza and Khanyounis governorates. The total number of mothers of children with rickets who are attending and registered at Ard El-Insan Palestinian Benevolent Association is 1010 in the Gaza Strip. (AEI, 2017)

3.7 Study sample and sampling

Sample size was calculated based on the previous year population. It was 235 children (more than 20%). Stratified sampling method was done based on geographical area and the number of cases in each association to draw the sample from each centre. thus a convenience sampling process was selected(136 from Gaza center and 99 fromKhayounis).

3.8 Response rate

All the interviewed mothers who were responded during the interviewed their questionnaire were included after being reviewed for quality of data (100%) i.e 235 cases.

3.9 Selection criteria

3.9.1 Inclusion criteria

- Mother of children with rickets and registered at Ard El-Insan Palestinian Benevolent Association.
- Age of child from 6 – 36 months
- Mothers who are agreed to participate in the study.

3.9.2 Exclusion criteria

- Children above 36 months.
- Mothers who have mental or psychological problems
- Mothers who are not interested to participate in the study.

3.10 Instrument of the study

Interviewing questionnaire by face to face was used in this study. The researcher developed a questionnaire for this study with reference to the previous studies and with consultation of experts in this field (Annex 6).

3.10.1 Questionnaire design

The questionnaire consisted of four parts, the first part consisted of socio-demographic variables of the mother and the child, the second part reflected the level of mother's knowledge regarding rickets and the nutrition needed for the prevention of the disease, the third part reflected the level of mother's practices at the home toward rickets, and the fourth part reflected the mother's perception of the causes of rickets. Some of the questions which have been used in the questionnaire adopted yes/no answer; some of them adopted the design of multiple choice, and the last domain (causes of rickets) adopted a scale of three answers (causes, does not cause, do not know). The questionnaire designed in English language and it was translated into Arabic. The questionnaire was revised by those who are experienced and expert in this field.

3.10.2 Scoring of the questionnaire

The mothers have been granted a score of "one" for a correct answer on the questionnaire, and a score of "zero" for incorrect answer. The total score for the second part which reflected the knowledge regarding rickets is 48, the total score for the third part which reflected the practices regarding rickets is 12, and the last part which reflected the perception of mothers regarding the causes of rickets is 15 (Annex 3).

3.11 Pilot study

Pilot study was conducted on 30 subjects from the mothers who are attending Ard El-Insan Palestinian Benevolent Association, in order to provide feedback about the questionnaire and ensure feasibility of study and reliability of questionnaire.

3.12 Validity of the instrument

3.12.1 Face and content validity

Face validity was done by the researcher and the experts in the field. Regarding content validity, the questionnaire was submitted to panel of experts with experience and knowledge in the field of study to make suggestions and judgment about the adequacy of the instrument to evaluate and identify whether the questions agreed with the scope of the items and the extent to which these items reflect the concept of the research problem. The questionnaire was modified based on the comments of the experts before being tested in the pilot study.

3.13 Statistical management

To achieve the goal of the study, the researcher used the statistical package for the Social Sciences (SPSS, IBM V. 22) for analysing the collected data.

3.14 Statistical methods which have been used include

1. Descriptive statistics such as frequencies, mean, standard deviations and percentages.
2. Bivariate analysis was used such as independent sample *t* test, one-way ANOVA
3. Pearson correlation.

3.15 Administrative and ethical consideration

The researcher was committed to all ethical considerations required to conduct a research, ethical approval was obtained from Helsinki committee to carry out the study (Annex 1), a letter of approval was obtained from Ard El-Insan Palestinian Benevolent Association to conduct the study (Annex 2) . Also, an informed consent was obtained from all mothers as well to fill up the questionnaire.

Chapter Four

Results and Discussion

4.1 Introduction

This chapter illustrates the results of statistical analysis of the data, including descriptive analysis that presents the socio -demographic characteristics of the study sample and answers to the study questions. The researcher used simple statistics including frequencies, means and percentages, also independent sample *t* test, One-way ANOVA and Pearson correlation were used.

4.2 Socio-demographic characteristics of the sample

4.2.1 Sample distribution according to the mothers' age groups, fathers' age groups, and the residence

Table 4.1: Sample distribution according to the mothers' age groups, fathers' age groups, and the residence

Variables		Number	Percentage (%)
Age groups of the mothers	Below 25 years	78	33.2
	25 – 35 years	142	60.4
	More than 35 years	15	6.4
Age groups of the fathers	Below 25 years	22	9.4
	25 – 35 years	154	65.5
	More than 35 years	59	25.1
Residence	Gaza	97	41.3
	North Gaza	30	12.8
	Middle area	9	3.8
	Khanyounis	86	36.6
	Rafah	13	5.5
	Total	235	100.0

Table 4.1 shows the distribution of study participants' according to the mothers' age groups, fathers' age groups, and the residence. The table shows that more than half (60.4%) of the mothers of the children with rickets are belonging to the age group 25 – 35 years, and 33.2% of them are below 25 years. also, the table shows that more than half (65.5%) of the fathers of the children with rickets are belonging to the age group 25 – 35 years, while 9.4% of them are below 25 years old.

Moreover, the table shows that 97 (41.3%) of the study participants' are from Gaza governorate, 86 (36.6%) of them are from Khanyounis governorate, and only 9 (3.8%) are from the middle area.

4.2.2 Sample distribution according to the educational level of the mothers

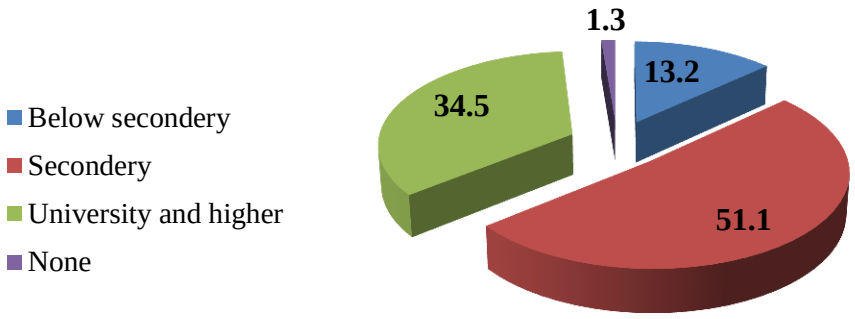

Figure 4.1: Sample distribution according to the mothers' educational level

Figure 4.1 shows that 51.1% of the mothers have secondary level education, 34.5% have university degree and higher, while only 1.3% of them are absolutely not educated.

4.2.3 Sample distribution according to the educational level of the fathers

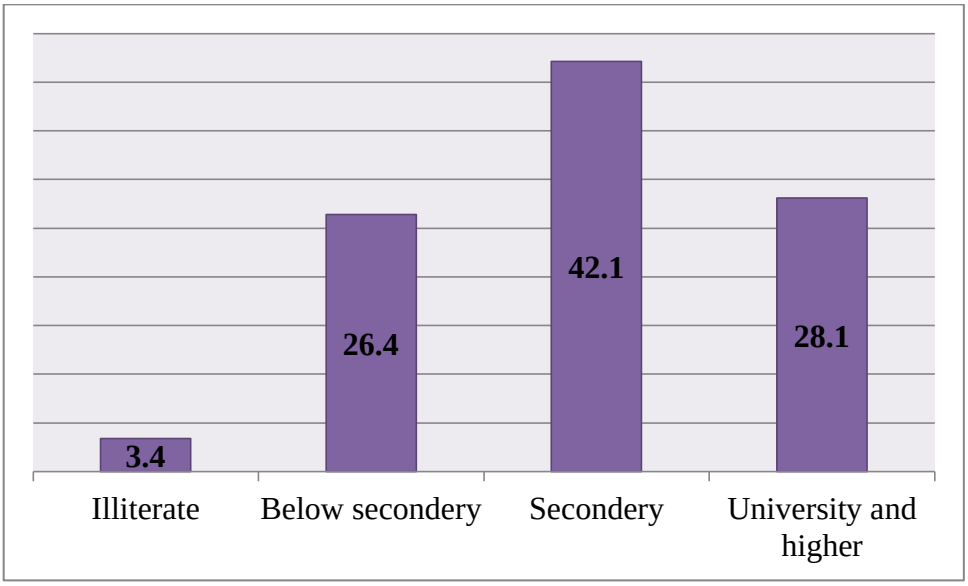

Figure 4.2: Sample distribution according to the fathers' educational level

Figure 4.2 shows that 42.1% of the fathers have secondary level education, 28.1% have university degree and higher, while only 3.4% of them are absolutely not educated.

4.2.4 Sample distribution according to the employment status of the study participants

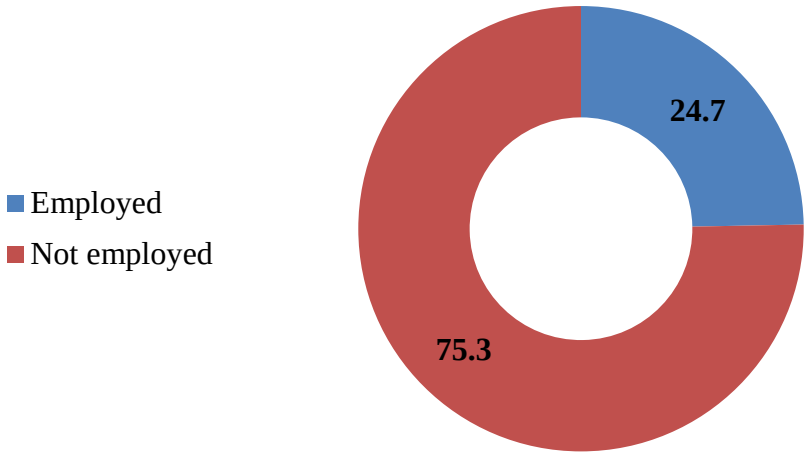

Figure 4.3: Sample distribution according to the employment status of the mothers

Figure 4.2 shows that the majority (75.3%) of the mothers are not employed, while 24.7% of them are employed.

4.2.5 Sample distribution according to the level of income of the study participants

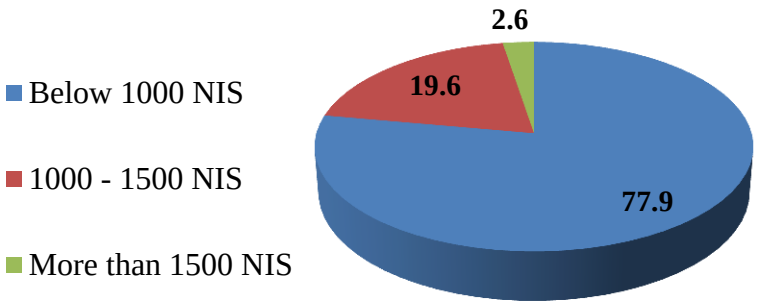

Figure 4.4: Sample distribution according to the level of income of the study participants

Figure 4.2 shows that the majority (77.9%) of the study participants have average income level of less than 1000 Shekel, 19.6% of them have average income between 1000 and 1500 Shekel, while the income level of 2.6% of the study participants are more than 1500 Shekel.

4.3 Mothers who have other children with rickets and those who were receiving vitamin D during pregnancy

Table 4.2: Mothers who have other children with rickets and those who were receiving vitamin D during pregnancy

Variables		**Number**	**Percentage (%)**
Having children with rickets	Have child with rickets	44	18.7
	Do not have	191	81.3
	Total	**235**	**100.0**
Taking vitamin D during pregnancy	No	210	89.4
	Yes	25	10.6
	Total	**235**	**100.0**

Table 4.2 shows that the vast majority 18.7% of the mothers have other children with rickets, while (81.3%) of them do not. The table also shows only 10.6% of the mothers were receiving vitamin D during pregnancy and 89.4% of them were not.

4.4 Mean score of knowledge, practices, and perceptions of the mothers of children with rickets in the Gaza governorates

Table 4.3: Mean score of knowledge, practices, and perceptions of the mothers of children with rickets in the Gaza governorates

Variables	Maximum score	Mean score	Mean %
Level of Knowledge	48	23.62	49.21
Level of Practices	12	4.36	36.34
Level of perception	15	8.85	59.0

The table shows that the mean score of mothers' knowledge regarding rickets is 23.62 out of 48 with a mean percentage of 49.21% which is considered as low level. Also, the mean score of mothers' practices is 4.36 out of 12 with a mean percentage of 36.34% which is considered as low level. On the other hand, the mean score of the mothers' level of perception regarding the causes of rickets is 8.85 out of 15with a mean percentage of 59.0% which is considered as negative perception.

4.5 Differences in the level of knowledge, practices and perceptions of mothers between their different educational levels

Table 4.4: Differences in the level of knowledge, practices and perceptions of mothers between their different educational levels

Variable	N	Mean (SD)	F (df)	*P* value*
level of knowledge				
Not educated	3	27.77 (19.24)	3.621 (3, 231)	0.014
Below secondary	31	45.16 (17.40)		
Secondary	120	48.05 (18.40)		
University and higher	81	53.26 (16.57)		
level of practices			1.104 (3, 231)	0.348
Not educated	3	36.11 (41.10)		
Below secondary	31	31.98 (14.76)		
Secondary	120	35.97 (17.45)		
University and higher	81	38.58 (7.40)		
level of perceptions			2.756 (3, 231)	0.043
Not educated	3	57.77 (23.41)		
Below secondary	31	54.83 (16.66)		
Secondary	120	57.27 (17.51)		
University and higher	81	63.12 (14.87)		

*One way ANOVA

Table 4.4 shows that there are significant differences in the level of mothers' knowledge regarding rickets between their different educational levels ($p<0.05$). Post hoc analysis was done using LSD test and shows that the difference is between the group of mothers who have below secondary education and the mothers who have university degree and higher in favor of those who have university degree and higher. Also, the table shows that there are no significant differences in the level of mothers' practices regarding rickets between their different educational levels ($p>0.05$). Additionally, there are significant differences in the

level of mothers' perception regarding rickets between their different educational levels ($p<0.05$). Post hoc analysis was done using Last Significant Difference (LSD) test and shows that the difference is between the group of mothers who have below secondary education and the mothers who have university degree and higher in favor of those who have university degree and higher.

4.6 Differences in the level of knowledge, practices and perceptions of mothers between their different age groups

Table 4.5: Differences in the level of knowledge, practices and perceptions of mothers between their different age groups

Variable	N	Mean (SD)	F (df)	*P* value*
Level of knowledge				
Below 25 years	78	46.66 (17.68)	3.050 (2, 232)	0.049
25 – 35 years	142	51.36 (17.94)		
More than 35 years	15	42.08 (16.05)		
Level of practices			1.343 (2, 232)	0.263
Below 25 years	78	34.93 (17.14)		
25 – 35 years	142	37.67 (18.04)		
More than 35 years	15	31.11 (11.97)		
Level of perceptions			0.700(2, 232)	0.498
Below 25 years	78	58.37 (18.70)		
25 – 35 years	142	59.76 (16.04)		
More than 35 years	15	54.66 (12.64)		

*One way ANOVA

Table 4.5 shows that there are significant differences in the level of mothers' knowledge regarding rickets between their different age groups ($p<0.05$). Post hoc analysis was done using LSD test and shows that the difference is marginally significant between the group of mothers aged between 25 – 35 years and those who are more than 35 years old in favour of the mothers who are belonging to the group 25 – 35 years.

Also, the table shows that there are no significant differences in the level of mothers' practices regarding rickets between their different age groups (p>0.05). Moreover, there are no significant differences in the level of mothers' perception regarding rickets between their different age groups (p>0.05).

4.7 Differences in the level of knowledge, practices and perceptions of mothers between their different areas of residence

Table 4.6: Differences in the level of knowledge, practices and perceptions of mothers between their different areas of residence

Variable	N	Mean (SD)	F (df)	*P* value*
level of knowledge				
Gaza	97	56.55 (20.33)	8.241 (4, 230)	<0.001
North Gaza	30	41.59 (21.68)		
Middle area	9	49.76 (17.66)		
Khanyounis	86	43.99 (10.26)		
Rafah	13	46.15 (9.15)		
level of practices			2.071 (4, 230)	0.085
Gaza	97	39.43 (19.22)		
North Gaza	30	38.33 (23.32)		
Middle area	9	37.96 (15.65)		
Khanyounis	86	32.46 (12.84)		
Rafah	13	33.33 (11.78)		
level of perceptions			1.959(4, 230)	0.102
Gaza	97	58.28 (16.92)		
North Gaza	30	52.22 (19.18)		
Middle area	9	59.25 (25.48)		
Khanyounis	86	61.47 (14.79)		
Rafah	13	63.07 (12.05)		

*One way ANOVA

Table 4.6 shows that there are significant differences in the level of mothers' knowledge regarding rickets between their different areas of residence (p<0.05). Post hoc analysis was done using Scheffe test and shows that the difference is significant between the group of mothers who are living in Gaza governorate and those who are living in the north area, and

between the mothers who are living in Gaza governorate and those who are living in Khanyounis in favor of the mothers who are living in Gaza governorate.

Also, the table shows that there are no significant differences in the level of mothers' practices regarding rickets between their different areas of residence ($p>0.05$). Additionally, there are no significant differences in the level of mothers' perception regarding rickets between their different areas of residence ($p>0.05$).

4.8 Differences in the level of knowledge, practices and perceptions of mothers between their level of income

Table 4.7: Differences in the level of knowledge, practices and perceptions of mothers between their level of income

Variable	N	Mean (SD)	F (df)	*P* value*
Level Of Knowledge				
Below 1000 Shekel	183	48.36 (17.88)	0.933 (2, 232)	0.395
1000 – 1500 Shekel	46	52.12 (18.40)		
More than 1500 Shekel	6	52.77 (52.77)		
Level Of Practices			5.154 (2, 232)	0.006
Below 1000 Shekel	183	34.79 (16.71)		
1000 – 1500 Shekel	46	40.21 (19.34)		
More than 1500 Shekel	6	54.16 (11.48)		
Level Of Perceptions			1.061 (2, 232)	0.348
Below 1000 Shekel	183	59.74 (16.09)		
1000 – 1500 Shekel	46	56.81 (19.76)		
More than 1500 Shekel	6	52.22 (10.68)		

*One way ANOVA

Table 4.7 shows that there are significant differences in the level of mothers' practices regarding rickets between their different level of income ($p<0.05$). Post hoc analysis was done using Scheffe test and shows that the difference is significant between the group of mothers who have average income below 1000 Shekel and those who have average income more than 1500 Shekel in favour of the mothers who have average income more than 1500 Shekel.

Also, the table shows that there are no significant differences in the level of mothers' knowledge regarding rickets between their different level of income ($p>0.05$).

Additionally, there are no significant differences in the level of mothers' perception regarding rickets between their different level of income ($p>0.05$).

4.9 Differences in the level of knowledge, practices and perceptions of mothers between their status of employment

Table 4.8: Differences in the level of knowledge, practices and perceptions of mothers between their status of employment

Variable	Mean (SD)		*t* statistics (df)	*p* value*
	Employed	Not employed		
Level Of Knowledge	55.38 (21.53)	47.18 (16.14)	2.665 (79.05)	0.009
Level Of Practices	39.36 (20.40)	35.35 (16.33)	1.361 (82.30)	0.177
Level Of Perceptions	60.34 (17.76)	58.53 (16.47)	0.714 (233)	0.476

*Independent sample *t* test

Table 4.8 shows that there are significant differences in the level of mothers' knowledge regarding rickets between those who are employed and who are not ($p<0.05$). The mothers who are employed have knowledge score significantly higher than those who are not. Also, the table shows that there are no significant differences in the level of mothers' practices and perception regarding rickets between those who are employed and who are not ($p>0.05$).

4.10 Differences in the level of knowledge, practices and perceptions of mothers between the mothers who have other children with rickets and do not

Table 4.9: Differences in the level of knowledge, practices and perceptions of mothers between the mothers who have other children with rickets and do not

Variable	Mean (SD)		*t* statistics (df)	*p* value*
	Mother with other children without rickets	Mother with other children with rickets		
Level Of Knowledge	48.16 (17.66)	53.74 (18.57)	-1.869 (233)	0.063
Level Of Practices	36.12 (17.59)	37.31 (17.09)	-0.405 (233)	0.686
Level Of Perceptions	59.19 (17.15)	58.03 (15.18)	0.415 (233)	0.678

*Independent sample *t* test

Table 4.9 shows that there are no significant differences in the level of mothers' knowledge, practices, and perception regarding rickets between those who have other children with rickets and who do not ($p>0.05$).

4.11 Correlation between the level of mothers' knowledge and their level of perception of the causes of rickets, and their practices

Table 4.10: Correlation between the level of mothers' knowledge and their level of perception of the causes of rickets, and their practices

	Level of Practices	
	r	*P* value*
Level of Knowledge	0.273	< 0.001
Level of perception	0.130	0.046

*Pearson correlation

The table shows that there is a week significant correlation ($r=0.589$) between the level of mothers' knowledge and their practices regarding rickets ($p<0.001$), meaning that; with

increase in the level of mothers' knowledge, their level of practices will increase. Also, there is a week significant correlation (r=0.130) between the level of mothers' perception and their level of practices regarding rickets, meaning that; with increase in the level of mothers' perception, their level of practices will increase.

4.12 Correlation between the level of knowledge, practices and perceptions of mothers and the number of their pregnancies

Table 4.11: Correlation between the level of knowledge, practices and perceptions of mothers and the number of their pregnancies

	Number of Pregnancies	
	R	***P* value***
Level of Knowledge	0.035	0.593
Level of Practices	-0.033	0.614
Level of perception	-0.046	0.481

*Pearson correlation

The table shows that there is no significant correlation between the level of mothers' knowledge, practices, and the level of perception regarding rickets and their number of pregnancies ($p>0.001$).

4.13 Correlation between the level of knowledge, practices and perceptions of mothers and the number of their deliveries

Table 4.12: Correlation between the level of knowledge, practices and perceptions of mothers and the number of their deliveries

	Number of Deliveries	
	r	***P* value***
Level of Knowledge	0.005	0.936
Level of Practices	-0.047	0.472
Level of perception	-0.060	0.358

*Pearson correlation

Table 4.12 shiows that there is no significant correlation between the level of mothers' knowledge, practices, and the level of perception regarding rickets and their number of deliveries ($p>0.001$).

4.14 Discussion of the Results

4.14.1 Introduction

The main aim of this study is to assess the knowledge, perceptions and practices of mother of children with rickets in the Gaza Strip. In this section, the previously mentioned results are discussed in details within the current status of Gaza Strip and the nature of study conducted, also these results are discussed within the scope of previous studies.

4.14.2 Mothers' knowledge, practices, and perception regarding rickets

The mean knowledge score, practices score, and perception score of the mothers in this study are not consistent with the results of Njeri (2013) which showed that the mean score of knowledge of rachitic children mothers was 63.9%, and the mean score of perception was 61.8%. These results could be attributed to the nature of the current study sample, in which more than half (64.3%) of the mothers have secondary level of education and below. This percentage of mothers can affect the knowledge, practice, and perception score of them, since the more educated mothers might have more knowledge, practice, and perception score.

On the other hand, the study of Adegbehingbe et al. (2009) revealed that only 22.6% of the mothers had correct knowledge and perception about rickets, and there were very low proportions of mothers had correct knowledge on the causes of rickets. Also, the study of Cicek et al. (2015) revealed that the level of knowledge of mothers and their attitudes regarding regular vitamin D usage for their children were not found to be at an adequate level, and this is consistent with what revealed in the current study results in which 70.6% of the mothers have inadequate level of knowledge, 82.2% of them have unsatisfactory practices, and 56.6% have negative perception about the causes of rickets.

Regarding the perception of the mothers about the causes of rickets, the current study results are consistent with the results of Adegbehingbe et al. (2009) which showed that

there were very low proportions of mothers who had correct knowledge on the causes of rickets. These results could be attributed to the nature of the questions which have been asked to the mothers, the majority of the questions require previous knowledge and evidence-based information for them to answer, since the mothers who were included in this study were not from medical or any health-related field; thus they would face difficulty in the answering process. Moreover, regarding the low level of practices among mothers which was revealed in the current study; the results of Abate et al. (2016) revealed that the respondents in their study had poor practice about sunlight exposure.

Based on the above mentioned results and previous discussed studies, low level of mothers' knowledge affect their level of practices and their level of perception. We can conclude from the results of the current study and the results of the previous studies that the knowledge level of the mothers regarding rickets is not adequate.

4.14.3 Differences in the level of knowledge, practices and perceptions of mothers regarding rickets between their different demographic factors of the mothers

Regarding the differences in the level of mothers' knowledge regarding rickets between their demographic factors, the results revealed that there are significant differences in the level of mothers' knowledge regarding rickets between their different educational levels and different age groups in favor of those who have university degree and higher and who are belonging to the group 25 – 35 years respectively. The results are consistent with the results of Mrad et al. (2009) which showed that the educational level of the mothers is a significant factor which influence the knowledge about vitamin D.

Also, the mothers' perception regarding rickets is significantly higher among those who have university degree and higher. This could be attributed to the fact that the mothers with

university degree education have more knowledge and better health culture than those who do not. These results are consistent with the results of Adegbehingbe et al. (2009) which showed that the mother's cultural perceptions about rickets was significantly affected by age, education, skilled occupation. Moreover, these results are consistent with the results of Abate et al. (2016) which showed that mothers' educational status had significant association with practice of sunlight exposure of infants. This could be attributed to the fact that the higher educational level, the higher level of knowledge, practices and perception.

On the other hand, the results of Cicek et al. (2016) are not consistent with the current study results, in which they revealed that there was no difference between education level of mothers in regard to vitamin D usage for their children, this inconsistency could be attributed to the type of sample included in their study, the nature of mothers who are included of their study, and their level of education.

On the other hand, table 4.7 shows that there are significant differences in the level of mothers' knowledge between their different areas of residence in favor of the mothers who are living in Gaza governorate. This could be attributed to the nature of the sample hired in this study, in which the higher percentage (41.3%) of the mothers within this study is from Gaza governorate. Also, 39.5% of the mothers in the Gaza governorate have university degree or higher, this can affect the results. This result is consistent with the result of Mrad et al. (2009) which showed that the mothers' residence (living far away from a primary health care) was a significant factor which influenced the knowledge about vitamin D.

If we look at the results, we would see that the lowest mean percentage of mothers' knowledge and their perception were among those who are living in the north area, this could attributed to the lowest number of sample from the north area beside the lowest

percentage (6.2%) of university degree educated mothers among those who are living in the north area. Also, this result is consistent with the result of Zadka et al. (2018) which showed that there were statistically significant influences on the level of knowledge about the functions and sources of vitamin D between different areas of residence. The research noted that there are scarce in the previous studies regarding he differences in the knowledge, practices, and perception of rickets between different residence areas.

Additionally, the study results revealed that that there are significant differences in the level of mothers' practices between their different level of income in favor of the mothers who have average income more than 1500 Shekel. This could be attributed to the fact that the individuals who have better educational level; they have better level of practices, thus they would have better level of income in general. This result is consistent with the results of Zadka et al. (2018) which showed that the higher net income of the family had better knowledge about nutritional sources of vitamin D.

On the other hand, the absence of significant difference in the level of mothers' knowledge and their perception regarding rickets between their different levels of income could be attributed to the inconsistency of the frequency and percentages between the mothers group of income.

Moreover, the current study results revealed that the mothers who are employed have knowledge score significantly higher than those who are not. This result is consistent with the result of Adegbehingbe et al. (2009) which showed that the knowledge about rickets was influenced by occupation. Also, this result is supported by the current study results in which the level of mothers' practices is different between different levels of income; this is because the knowledge affects the level of practice, that's why their practices are differentiated with different level of income.

On the other hand, the current study result revealed that there are no significant differences in the level of mothers' practices and perception regarding rickets between those who are employed and who are not. This result is not consistent with the result of Abate et al. (2016) which showed that the mothers who have occupation; have less likely practices of sunlight exposure than the mothers who do not. The absence of significant difference in this study could be attributed to the nature of the sample, in which only 24.7% of the mothers of children with rickets in the current study are working, meaning the high percentage of the not-working mothers contribute to the absence of significant difference between the two groups.

The results in the current study revealed that there are no significant differences in the level of mothers' knowledge, practices, and perception regarding rickets between those who have other children with rickets and who do not, this could attributed to the fact that 81.3% of the mothers in the current study do not have other children with rickets, meaning that this disease is new for them and if there are some difference between who have other children and who do not; the difference would not be obvious.

Moreover, the results of the current study revealed that with increase in the level of mothers' knowledge, their level of practices will increase. This result could be attributed to the fact that with increased level of knowledge level, level of practice would improve. Also, with increase in the level of mothers' perception, their level of practices will increase. We can conclude from these results that the mothers' knowledge, practices, and their perception can affect each other's.

The table shows that there is no significant correlation between the level of mothers' knowledge, practices, and the level of perception regarding rickets and their number of pregnancies. This result is not consistent with the result of Mrad et al. (2009) which showed that the parity of the mothers did not have an influence on the mothers' practices.

Chapter Five

Conclusion and Recommendations

5.1 Conclusion

The main aim of this study was to assess the knowledge, perceptions and practices of mothers of rachitic children in the Gaza Strip. The study adopted cross-sectional design on a convenience sample from the two centers of Ard El-Insan Palestinian Benevolent (Gaza governorate and Khanyounis), in which 136 mothers participated from Gaza and 99 from Khanyounis. The researcher used an interview questionnaire to collect date from the mothers.

From the findings of this study, the researcher concluded the following

The mean percentage score of mothers' knowledge regarding rickets was low (49.21%), and the mean percentage score of their practices was low (36.34%), while their mean percentage score regarding perception was negative (59.0%). The majority (70.6%) of the mothers have inadequate level of knowledge, 82.1% of them have unsatisfactory practices, while 56.6% of them have negative perception regarding rickets.

Additionally, there were significant differences in the level of mothers' knowledge between their different educational levels in favour of those who have university degree and higher, and there were no significant differences in the level of mothers' practices between their different educational levels. Moreover, there were significant differences in the level of mothers' knowledge between their different age groups in favour of the mothers who are 25 – 35 years. On the other hand, the mothers who are employed have knowledge score significantly higher than those who are not, and there was a week significant correlation between the level of mothers' knowledge and their practices regarding rickets.

5.2 Recommendations

Based on the previous results, the researcher recommends conducting health educational sessions for the mothers of children with rickets in Ard El-Insan Palestinian Benevolent. Health education should be concentrated for those who are below university level and below 25 years old. Also, mass media and social media with different types should be used to influence these educational efforts. Additionally, training workshops are needed to enhance mothers' practices regarding rickets and how to prevent the problem. More importantly, vitamin D supplementation should be available for all mothers with essential educational about how to use it for their children.

5.2.1 Recommendations for policy makers

Health care system in the Gaza Strip with its main providers should have its basic responsibility toward the problem of rickets. Ministry of health with cooperation of private sector and nongovernmental organizations should organize health educational efforts for the mothers and care givers regarding the prevention and treatment of the problem. Their educational efforts should be directed toward the recommended practices for the children with rickets and conducting nutritional education.

Also, the main providers of health care services in the Gaza Strip should maximize their services toward the provision of preventive measures and treatment modalities for the problem especially for those who have low income. Moreover, maximizing cooperation between the government, non-governmental and the private sector to provide high quality services for children with rickets in the Gaza Strip.

5.2.2 Recommendations for future research

This study is the first to be conducted in the Gaza Strip regarding rickets, however; it is considered as the stepping stone for further research. Further studies are strongly needed to investigate the risk factors of the problem, magnitude of it, and other preventive measures. Further research is also needed to investigate which group of children exactly is affected in the Gaza Strip. Moreover, future studies are needed to explore the possibility of other micronutrient deficiency which may contribute to the occurrence of rickets in the Gaza Strip. Additionally, a nutritional surveillance system the Gaza Strip is recommended to identify those for high risk.

5.3 Limitations of the study

Limited previous studies especially the ones which measure the knowledge and practices regarding rickets. Since there are no cases attending MoH and PHC facilities; the study was conducted on a sample from AEI only.

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Annex 1: Approval from Helsinki

المجلس الفلسطيني للبحث الصحي

Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee

For Ethical Approval

Date: 05/02/2018 **Number:** PHRC/HC/307/18

Name: HEBA ZIENALDIEN الاسم:

We would like to inform you that the committee had discussed the proposal of your study about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Assessment of Knowledge, Perceptions and Practices of Mothers of Children with Rickets in Gaza Governorates.

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/307/18 in its meeting on 05/02/2018

و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

5/2/2018

Chairman

Genral Conditions:-

1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

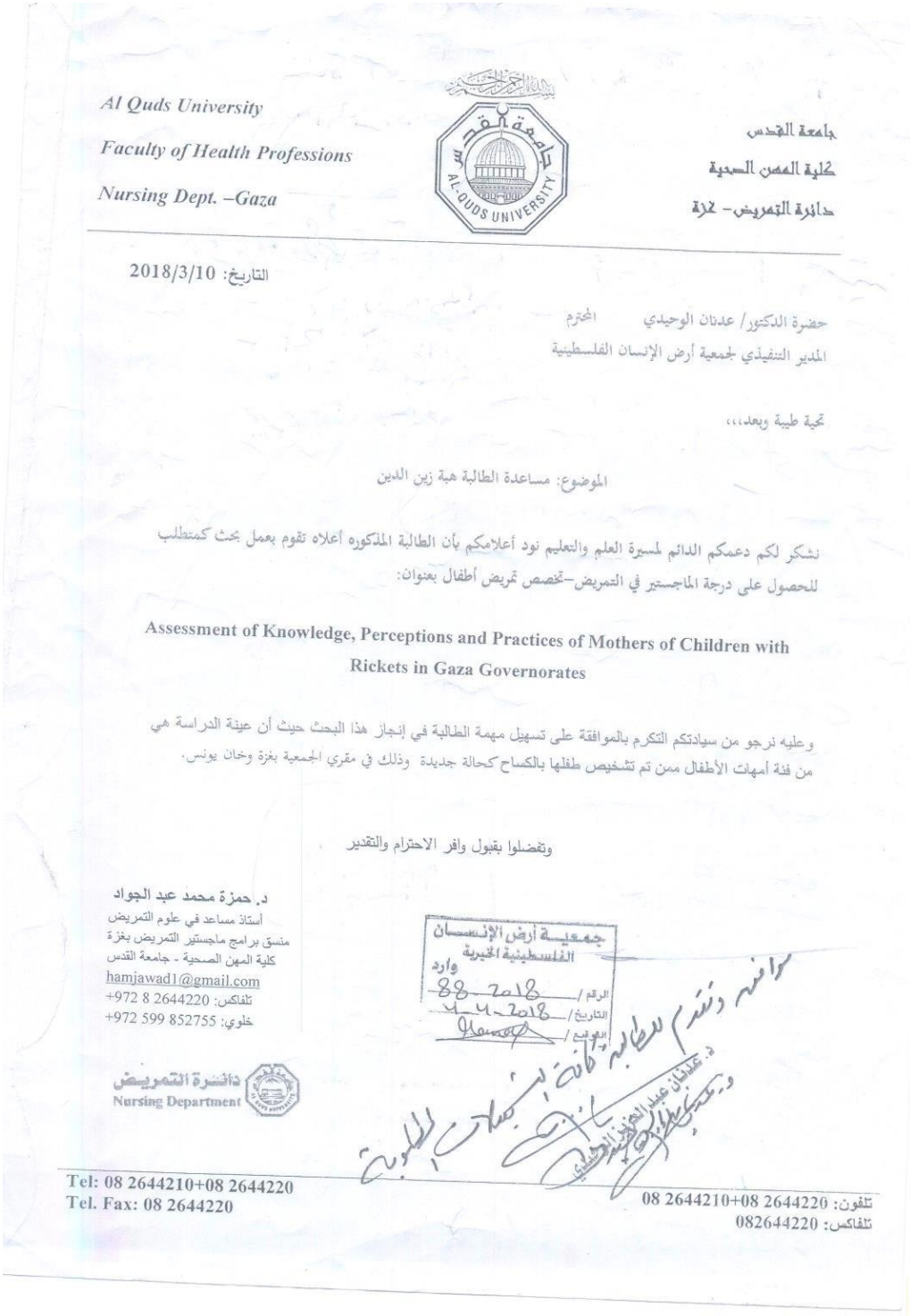
Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Gaza - Palestine غزة - فلسطين

شارع النصر - مفترق العيون

Annex 2: Approval from AlQuds University and Ard Alensan



Al Quds University
Faculty of Health Professions
Nursing Dept. –Gaza

جامعة القدس
كلية المهن الصحية
دائرة التمريض- غزة

التاريخ: 2018/3/10

حضرة الدكتور/ عدنان الوحيدي المحترم
المدير التنفيذي لجمعية أرض الإنسان الفلسطينية

تحية طيبة وبعد،،،

الموضوع: مساعدة الطالبة هبة زين الدين

نشكر لكم دعمكم الدائم لمسيرة العلم والتعليم نود أعلامكم بأن الطالبة المذكوره أعلاه تقوم بعمل بحث كمتطلب للحصول على درجة الماجستير في التمريض–تخصص تمريض أطفال بعنوان:

Assessment of Knowledge, Perceptions and Practices of Mothers of Children with Rickets in Gaza Governorates

وعليه نرجو من سيادتكم التكرم بالموافقة على تسهيل مهمة الطالبة في إنجاز هذا البحث حيث أن عينة الدراسة هي من فئة أمهات الأطفال ممن تم تشخيص طفلها بالكساح كحالة جديدة وذلك في مقري الجمعية بغزة وخان يونس.

وتفضلوا بقبول وافر الاحترام والتقدير

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جمعية أرض الإنسان الفلسطينية الخيرية
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Annex 3: Questionnaire: Arabic Version

أختي الفاضلة

السلام عليكم ورحمة الله وبركاته

تقوم الباحثة الموقعة أدناه بإعداد رسالة ماجستير بعنوان

Assessment of Knowledge, Perception and Practices of Mothers of rachitic Children in Gaza Governorates

تقييم معرفة وإدراك وممارسات أمهات الأطفال المصابين بلين العظام في محافظات غزة

إن هذا البحث يشكل جزء ضروري من دراستي كمتطلب أساسي للتخرج من جامعة القدس تخصص ماجستير تمريض الأطفال – وقد تم اختياركم ضمن مجموعة المشاركين في هذه الدراسة للإجابة على العبارات الواردة فيها.

إذا كنتي توافقين على المشاركة في هذه الدراسة، يرجى التكرم بقراءة العبارات التالية بدّقة والإجابة عنها بموضوعية لما في ذلك من أثرٍ كبير على صحة النتائج والتوصيات التي سوف تتوصل إليها الباحثة مع التأكيد بأن هذه البيانات سوف تستخدم لأغراض البحث العلمي فقط، وسيتم التعامل معها بسرية تامة، شاكرةً لكم تعاونكم ولطفكم.

□ **أوافق** □ **لا أوافق**

الباحثة: هبة زين الدين

الرقم التسلسلي .....

الجزء الأول: البيانات الخاصة بالأم

1. عمر الأم	..... سنة			
2. عمر الأب	..... سنة			
3. المحافظة	.....			
4. مستوى التعليم للأم	□ ابتدائي	□ إعدادي	□ ثانوي	
	□ جامعية	□ دراسات عليا	□ غير متعلمة	
5. مستوى التعليم للأب	□ ابتدائي	□ إعدادي	□ ثانوي	
	□ جامعي	□ دراسات عليا	□ غير متعلم	
6. عمر الطفل	.....	الجنس□ ذكر	□ أنثى	
7. عدد أفراد الاسرة داخل المنزل ..... فرداً/ أفراد				
8. ترتيب الطفل في الاسرة				
9. الدخل الشهري للأسرة ..... شيكل				
10. العمل	□ أعمل	□ لا أعمل		
11. عدد مرات الحمل ....مرة/مرات				
12. عدد مرات الولادة ....مرة/مرات				
13. عدد مرات الإجهاض .... مرة /مرات				
14.هل لديكِ طفلٌ آخر يعاني من مرض لين العظام؟	□ نعم	□ لا		
15.هل تناولت فيتامين "د" خلال فترة الحمل بهذا الطفل؟	□ نعم	□ لا		

الجزء الثاني: تقييم معرفة الأم حول مرض لين العظام

16.هل تعرفين ما هو المقصود ب "لين العظام" ؟	□ نعم 1	□ لا 0
17.هل بالإمكان علاج مرض لين العظام؟	□ نعم 1	□ لا 0
ما هي الأعراض التي قد تظهر على الطفل الذي يعاني من لين العظام؟		
18.هل تعرفين ذلك؟	□ أعلم1	□ لا أعلم 0 – إذا كنتي تعرفين الإجابة، انتقلي للأسئلة من رقم 19 وحتى 24
19.تأخّر إغلاق يافوخ الجمجمة الأمامي	□ نعم 1	□ لا 0
20.تأخر بروز الاسنان	□ نعم 1	□ لا 0
21.تقوس الساقين للخارج	□ نعم 1	□ لا 0
22.اصطكاك الركبتين	□ نعم 1	□ لا 0
23.توسُّع عظام رسغ اليد (تعرُّض العظام بمنطقة المِعصم)	□ نعم 1	□ لا 0
24.تشوه الصدر ووجود حبيبات سبحية على الضلوع	□ نعم 1	□ لا 0
أيٍ من هذه الأطعمة غني بفيتامين "د"		
25.هل تعلمين بذلك؟	□ أعلم1	□ لا أعلم – إذا كنتي تعرفين الإجابة، انتقلي للسؤال رقم 26
26.البيض	□ نعم 1	□ لا 0
27.الأسماك	□ نعم 1	□ لا 0
28.زيت السمك	□ نعم 1	□ لا 0
29.منتجات الألبان	□ نعم 1	□ لا 0
30.الزيوت المقوية	□ نعم 1	□ لا 0
31.السبانخ	□ نعم 1	□ لا 0

أي ٍمن هذه الأطعمة غني بـ "الكالسيوم"؟		
33.هل تعلمين بذلك	□ أعلم1	□ لا أعلم – إذا كنتِ تعرفين الإجابة، انتقلي لأسئلة من رقم 34 و حتى 39
34.الحليب	□ نعم 1	□ لا 0
35.الأسماك	□ نعم 1	□ لا 0
36.الكبد	□ نعم 1	□ لا 0
37.السمسم	□ نعم 1	□ لا 0

38.الخضراوات ذات الأوراق الخضراء الداكنة	□ نعم 1	□ لا 0

ما هي وسائل الوقاية من الإصابة بمرض لين العظام بين الأطفال؟		
40.هل تعلمين ذلك؟	□ أعلم1	□ لا أعلم0 – إذا كنتي تعرفين الإجابة، انتقلي للسؤال رقم 41
41.تعرض الطفل لأشعة الشمس المباشرة	□ نعم 1	□ لا 0
42.تناول أغذية غنية بالكالسيوم	□ نعم 1	□ لا 0
43.تناول أغذية غنية بفيتامين "د"	□ نعم 1	□ لا 0
44.تناول مكملات "الكالسيوم"	□ نعم 1	□ لا 0
45.تناول مكملات "فيتامين د""	□ نعم 1	□ لا 0

ما هي فائدة تعرض الطفل للشمس؟		
46.هل تعلمين ذلك؟	□ أعلم1	□ لا أعلم0 – إذا كنتي تعرفين الإجابة، انتقلي للسؤال رقم 47
47.يقوي العظام	□ نعم 1	□ لا 0
48.يمنع تشوه العظام	□ نعم 1	□ لا 0

49.يقوي الجسم	□ نعم 0	□ لا 1
50.تدفئة للجسم	□ نعم 0	□ لا 1
52.متى يجب البدء بتعرض الطفل لأشعة الشمس؟		
□ 0 – 15 يوماً 1	□ 16 – 30 يوماً 0	□ 31 – 45 يوماً 0
□ 46 يوماً فأكثر 0	□ لا أعلم 0	
ما هي مضاعفات مرض لين العظام؟		
54.هل تعلمين ذلك؟	□ أعلم1	□ لا أعلم. – إذا كنتي تعرفين الإجابة، انتقلي للسؤال رقم 55
55.تأخر بزوغ (بروز) الاسنان	□ نعم1	□ لا
56.تأخر الحبو (الزحف) و المشي	□ نعم 1	□ لا 0
57.تأخر نمو وتطور الطفل	□ نعم 1	□ لا 0
58.تشوهات عظمية متعددة	□ نعم 1	□ لا 0
59.نوبات تشنج	□ نعم 1	□ لا 0
60. انحناء العمود الفقري جانبياً أو للأمام أو الخلف...	□ نعم 1	□ لا 0
61.ضعف القدرات العقلية (الذهنية) للطفل	□ نعم 1	□ لا 0
ما هو علاج مرض لين العظام؟		
62.هل تعلمين ذلك؟	□ أعلم1	□ لا أعلم0 – إذا كنتي تعرفين الإجابة، انتقلي للسؤال رقم 63 وما يليه من أسئلة حتى رقم 67
63.تعرض الطفل لأشعة الشمس المباشرة	□ نعم 1	□ لا 0
64.أغذية غنية بالكالسيوم	□ نعم 1	□ لا 0
65.أغذية غنية بـ "فيتامين "د"	□ نعم 1	□ لا 0
66.إعطاء الطفل "الكالسيوم"	□ نعم 1	□ لا 0
67.إعطاء الطفل "فيتامين د""	□ نعم 1	□ لا 0

الجزء الثالث: تقييم ممارسات الأم حول مرض لين العظام

69.هل تعرضين طفلك لأشعة الشمس المباشرة؟		
□ نعم "يومياً" 2	□ نعم "أحياناً" 1	□ لا 0
إذا كانت الإجابة بـ نعم، انتقلي إلى السؤال رقم 70 وما يليه حتى رقم 71		
70.كم دقيقة تعرضين طفلك لأشعة الشمس المباشرة؟	..... دقيقة/دقائق	
71.الفترة التي يتم فيها تعرض الطفل لأشعة الشمس المباشرة؟		
□ الصباح "8 – 10 " 1	□ منتصف اليوم "11 – 1 " 0	□ بعد الظهر"2 – 4 " 0
72.ماذا بخصوص ملابس الطفل أثناء تعرضه لأشعة الشمس المباشرة؟		
□ بدون ملابس "الحفاظة الصحية فقط" 1	□ ملابس خفيفة/مغطىً بشكل جزئي0	□ ملابس كاملة0
73.ما هو الجزء من جسم الطفل الذي تعرضينه للشمس؟		
□ الوجه 0	□ اليدان 0	□ الساقان0	□ جميع أجزاء الجسم 1
74.في أي سن بدأتِ في إعطاء طفلك أطعمة/مشروبات أخرى بما في ذلك الماء والحليب ..... شهر		
78.هل أعطيتِ طفلك زيت السمك	□ نعم 1	□ لا 0
79..هل أعطيت طفلك نقط فيتامين أ و د قبل تشخيصه بمرض لين العظام؟	□ نعم 1	□ لا 0
80.إذا كانت الإجابة بنعم: فكم كان عمره عندما بدأت بذلك؟		
81.هل قمت بإعطائه النقط هذه بشكل متقطع؟	□ نعم 1	□ لا 0
82. هل استمريت في إعطائه بشكل متواصل؟	□ نعم 1	□ لا 0
83.كم كانت مدة إعطائه هذه النقط بالأشهر؟.....		

الجزء الرابع: تقييم مدى إدراك الأم حول أسباب مرض لين العظام

إلى أي مدى قد تسبب العوامل التالية مرض لين العظام عند الأطفال؟

		يتسبب	لا يتسبب	لا أعلم
90	المشي في سن مبكر (قبل الأوان)	1	0	0
91	الوراثة	1	0	0
92	نقص في معدل الكالسيوم بالدم	1	0	0
93	انخفاض معدل وزن الطفل بالنسبة للعمر	1	0	0
94	عدم تعرض الطفل للشمس بشكل كافٍ	1	0	0
95	عدم تلقي البروتينات بشكل كافٍ	0	1	0
96	ولادة قبل الأوان (قبل الموعدالمفترض للولادة)	1	0	0
97	الرضاعة الطبيعية الخالصة	1	0	0
98	نقص في فيتامين "د" في الغذاء أم المقصود نقصه في الدم	1	0	0
99	ولادات متعددة والتوائم والاهتمام بعدد أكبر من الأطفال بالأسرة	1	0	0
100	تباعد الولادات بشكل غير كافٍ	1	0	0
101	العدوى بالأمراض المنقولة .	0	1	0
102	تغذية غير كافية للأم الحامل	1	0	0
103	تغذية غير كافية للأم المرضع	1	0	0
104	عدم تغذية الطفل بالأغذية التكميلية في عمر 6 شهور وما بعدها	1	0	0

Annex 4: Questionnaire: English Version

Assessment of Knowledge, Perceptions and Practices of Mothers of Children with Rickets in Gaza Governorates

Serial number of the questionnaire _____

Section (1): Socio Demographic Data

<table>
<tr><td colspan="5">• Age of mother -------Years</td></tr>
<tr><td colspan="5">• Age of father -------Years</td></tr>
<tr><td colspan="2">• Governorate</td><td colspan="3">……..</td></tr>
<tr><td rowspan="2">• Years of mother education</td><td>□ Elementary</td><td>□ Preparatory</td><td>□ Secondary</td></tr>
<tr><td>□ University</td><td>□ Higher studies</td><td></td></tr>
<tr><td rowspan="2">• Years of father education</td><td>□ Elementary</td><td>□ Preparatory</td><td>□ Secondary</td></tr>
<tr><td>□ University</td><td>□ Higher studies</td><td></td></tr>
<tr><td colspan="2">• Age of the child</td><td colspan="3">-------</td></tr>
<tr><td colspan="2">• Monthly income</td><td colspan="3">------ Shekel</td></tr>
<tr><td colspan="3">• Number of family members in the child’s family</td><td colspan="2">-------- member</td></tr>
<tr><td colspan="3">• Number of the child in the family</td><td colspan="2">…….</td></tr>
<tr><td colspan="3">• Parity</td><td colspan="2">…… times</td></tr>
<tr><td colspan="3">• Do you have previous child have had rickets</td><td>□ Yes</td><td>□ No</td></tr>
<tr><td colspan="3">• Did you take vitamin D during pregnancy with this child</td><td>□ Yes</td><td>□ No</td></tr>
</table>

Section (2): Assessment of mothers' knowledge about rickets

16. Do you know the "rickets"?	□ Yes	□ No
17. Can the disease be cured?	□ Yes	□ No
What symptoms may appear on a child with rickets ?		
18. Do you know that?	**□ Know**	**□Do not know - If you know the answer, ask questions 19 to 24**
19. Late closure of fontanel	□ yes	□No
20. Late tooth eruptions	□ yes	□No
21. Bowing of the legs	□ yes	□ No
22. Knock knees	□ yes	□No
23 Enlargement of the joints	□ yes	□No
24.Chest wall deformity	□ yes	□No
Which foods are rich in vitamin D?		
25. Do you know that?	**□ Know**	**□Do not know - If you know the answer, go to Question No 26**
26. Eggs	□ yes	□No
27. Fish	□ yes	□No
28. Cod liver oil	□ yes	□No
29. Dairy products	□ yes	□No
30. Fortified oil or fat	□ yes	□No
31. Spinach	□ yes	□No
32. Others (specify)……		
. Which foods are rich in calcium?		

33. Do you know that?	**□ Know**	**□Do not know - If you know the answer, go to Question 34**
34. Milk	□ yes	□No
35. Fish	□ yes	□No
36. Liver	□ yes	□No
37. Dark green leafy vegetables	□ yes	□No
38 Sesame seeds	□ yes	□No
Others (specify)	……..	
What can you do to prevent your child from developing rickets?		
40. Do you know that?	**□ Know**	**□Do not know - If you know the answer, go to Question 41**
41.Sunbathing the child	□ yes	□No
42. Eat foods rich in calcium	□ yes	□No
43. Eat foods rich in vitamin "D"	□ yes	□No
44. Calcium 43 supplementation	□ yes	□No
45. Taking vitamin D supplements	□ yes	□No
What is the effect of exposure to sunlight?		
46. Do you know that?	**□ Know**	**□Do not know - If you know the answer, go to Question 47**
47. Strengthen bones	□ yes	□No
48. Prevent deformity	□ yes	□No

49. Strengthen body	□ yes	□No
50. Keep child warm	□ yes	□No
51. □ Others, ……..		

52. Age infant need to start exposure to sunlight		
□ 0 – 15 days	□ 16 – 30 days	□ 31 – 45 days
□ 46 days and above	□ Do not know	

53. What are the complications of rickets?		
54. Do you know that?	**□ Know**	**□Do not know - If you know the answer, go to Question 55**
55. Delays in the appearance of the teeth	□ yes	□No
56. Delay in crawling and walking	□ yes	□No
57. development of the child is delayed	□ yes	□No
58. Multiple orthopedic deformities	□ yes	□No
59. Spastic seizures	□ yes	□No
60. Curvature of the spine sideways, forward or posterior	□ yes	□No
61. The child's mental abilities are weak	□ yes	□No

What is the treatment of rickets?		
62. Do you know that?	**□ Know**	**□Do not know - If you know the answer, go to Question 67**
63. The child is exposed to direct sunlight	□ yes	□No
64. Foods rich in calcium	□ yes	□No
65.Foods rich in vitamin D	□ yes	□No
66. Give the child ""calcium	□ yes	□No
67. Giving the child vitamin D	□ yes	□No

Section (3): Assessment of mothers' practices of rickets

69. Do you sun bath your child?			
□ Yes (Daily)	□ Yes (sometimes)	□ No	
If, <u>YES; Please answer the questions (70 – 71).</u> **70. For how many minutes a day? ……. Minutes**			
71. **Time of sunlight exposure**			
□ Morning 8-10 AM	□ Mid-day 11AM-1PM	□ Afternoon 2-4 PM	
72. **Condition of clothing during exposure**			
□ Unclothed/with diapers	□ Partly covered	□ Completely covered	
73. **Which parts of the body were exposed?**			
□ Face	□ Arms	□ Legs	□ Whole body
74. **At what age did you start giving your child other foods/drinks including water, milk, and porridge?** ---------			
75. If your child was exclusively breastfed, did the child receive vitamin D supplements? □ Yes □ No			
76. <u>If yes</u>, during which period? ----------			
77. At what age the child was given<u>?</u>…….			
78. Do you give your child cod liver oil?		□ Yes	□ No
79.Did you give your child vitamin A and D before diagnosis with rickets?		□ Yes	□ No
80. If yes, how old was the child?		……	
81.Have you continued to give it continuously?		□ Yes	□ No
82. Did you give these intermittently?		□ Yes	□ No
83. How many times have you give your child vitamin D before establishment the diagnosis of rickets? ……			

Section (4): Assessment of mothers' perception about the causes of rickets

To what extent do you think the following factors can cause rickets among children?

Factors	**Causes**	**Does not cause**	**Do not Know**
84. Early walking			
85.Hereditary			
86. Inadequate intake of calcium			
87.Low birth weight			
88.Inadequate exposure to sunshine			
89.Inadequate intake of protein			
90. Premature birth			
91. Exclusive breast feeding			
92. Deficiency in vitamin D			
93. Multiple birth			
94. Inadequate child spacing			
95. Infection with communicable diseases			
96.Insufficient nutrition for pregnant mother			
97. Insufficient nutrition for breastfeeding mother			
98. Do not feed the child with supplementary foods at the age of 6 months and beyond			

Annex 5: Map of Palestine

العنوان: تقييم معرفة وإدراك وممارسات أمهات الأطفال المصابين بلين العظام في محافظات غزة

إعداد: هبة زين الدين.

إشراف: د. حمزة عبدالجواد.

ملخص

لقد حظي مرض لين العظام على الصعيد العالمي باهتمام كبير من اهتمامات الصحة العامة في عدد من البلدان المتقدمة والنامية، حيث تزَكز الاهتمام بسبب تأثيره على نمو العظام وتوازن المعادن في جسم الإنسان؛ ومع ذلك فقد كشفت الدراسات البحثية عن عدم كفاية معرفة الأمهات فيما يتعلق بهذه المشكلة، لقد هدفت هذه الدراسة إلى تقييم معرفة وإدراك وممارسات الأمهات حول مرض لين العظام في قطاع غزة، وقد تكون مجتمع الدراسة من أمهات الأطفال المصابين بمرض لين العظام في قطاع غزة اللواتي يترددن على جمعية أرض الإنسان الخيرية حيث تم اختيار عينة ملائمة قدرها (235) موزعة على محافظتي غزة (136) وخانيونس (99)، استجيب جميعا للمشاركة في الدراسة، وقد استخدمت الباحثة الاستبانة كأداة لجمع البيانات، وقد تم استخدام الأساليب الإحصائية مثل النسب المئوية والوسط الحسابي، واختبار ت لعينتين مستقلتين، واختبار التباين الأحادي، واختبار بيرسون.

لقد كشفت نتائج الدراسة أن متوسط نسبة معرفة الأمهات فيما يتعلق بمرض لين العظام هو 49.21%، وأن متوسط نسبة معرفتهن بالممارسات الخاصة بالمرض هي 36.34%، في حين أن متوسط إدراك الأمهات حول المرض 59.0%، كما وأظهرت النتائج وجود فروق ذات دلالة إحصائية في مستوى معرفة الأمهات وإدراكهن للمرض تعزي لمختلف مستوياتهن التعليمية المختلفة لصالح من حصلن على شهادة جامعية وأعلى، علاوة على ذلك، فقد أظهرت النتائج أن هناك وجود فروق ذات دلالة إحصائية في مستوى معرفة الأمهات فيما يتعلق بلين العظام تعزي لمنطقة السكن لصالح الأمهات اللواتي يسكنَ في محافظة غزة.

من ناحية أخرى، أظهرت نتائج الدراسة أن هناك فروقا ذات دلالة إحصائية في مستوى ممارسات الأمهات تعزي لمستوى الدخل الشهري لصالح الأمهات اللواتي لديهن مستوى دخل أكثر من 1500 شيكل شهريا ، في حين أنه لا توجد فروق ذات دلالة إحصائية في مستوى معرفة الأمهات وإدراكهن للمرض تعزي لمستوي الدخل، بالإضافة إلى ذلك، فإن الأمهات اللواتي يعملنَ لديهن درجة معرفة أعلى من أولئك اللواتي لا يعملنَ، في حين أنه لا توجد فروق ذات دلالة إحصائية في مستوى معرفة الأمهات وممارساتهن وإدراكهن تعزي لسبب وجود أطفال سابقين لدى

الأم يعانون من لين العظام أو من عدمه، وقد وكشفت نتائج الدراسة أيضًا أن هناك ارتباطًا ذا دلالة إحصائية بين مستوى معرفة الأمهات وممارستهن فيما يتعلق بلين العظام ، وهناك أيضا ارتباط ذو دلالة إحصائية بين مستوى إدراك الأمهات ومستوى ممارستهن فيما يخص لين العظام.

خلصت نتائج الدراسة إلى أن أمهات الأطفال المصابين بلين العظام في قطاع غزة لديهن مستوى منخفضا من المعرفة والممارسات فيما يختص بمرض لين العظام ، وبناءً على ذلك فقد أوصت الباحثة بإجراء جلسات تعليمية صحية وورش عمل تدريبية لتعزيز ممارسات الأمهات فيما يتعلق بلين العظام وكيفية الوقاية من ذلك المرض.